



OGDEN CITY

STORM WATER DESIGN MANUAL (SWDM)

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1 Purpose

The purpose of this Storm Water Design Manual (Manual) is to establish design criteria required for new private and public storm water infrastructure or storm water improvements within Ogden City (the City). This Manual includes:

- General information on the federal, state, and local regulations that govern storm water improvement projects
- Approved hydrologic, hydraulic, and water quality, standards for evaluating and designing storm water quantity and quality control measures in the City
- Standards for landscaping, monitoring and maintenance applicable to storm water facility designs
- Requirements for development submittal packages and permitting applications for review and approval by the City

This Manual will not provide solutions to all drainage problems, nor is the user restricted to these designs or procedures exclusively. Users of this Manual are encouraged to seek out innovative and effective methods in addition to those discussed within this guidance material to accommodate site-specific conditions. Finally, this Manual may be updated and expanded from time to time based on improvements in engineering, science, monitoring, and local maintenance experience.

2 Storm Water Regulations

Federal, state, and local regulations shall be followed for all storm water discharge and design. This Section is informational only and provides general information on related federal and state laws and regulations, and Ogden City Ordinances. Users of this Manual shall verify and comply with all applicable laws and regulations, as well as the requirements described in this Manual.

2.1 Federal Laws and Regulations

The United States Environmental Protection Agency (EPA) created the National Pollutant Discharge Elimination System (NPDES) in 1972 under the Clean Water Act (CWA). The NPDES permit program allows state governments to perform permitting, administrative, and enforcement aspects of this program. Refer to the EPA website for the latest information.

2.2 State of Utah Regulations

The General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4 Permit) is one of the storm water sources that is regulated by the Utah Pollutant Discharge Elimination System (UPDES) which is the Utah version of the federal NPDES regulations. Some other sources of storm water which are regulated by the UPDES Program are construction sites and industrial sites. Refer to the Utah Department of Environmental Quality (DEQ) Division of Water Quality (DWQ) website for the latest information.

2.3 City of Ogden Storm Water Regulations

Ogden City has implemented ordinances for storm water management. Further design and construction requirements for the City are governed by this Manual, the Engineering Standards for Public Improvements, and the City's Storm Drain Master Plan. **Any deviation from these standards must be approved by the City Engineer.** The Ogden City Storm Water Management Plan (SWMP) has also been implemented as a management guidance for developers. Refer to the Ogden City website or reach out to the Ogden City Engineering Division for the latest information. Furthermore, Ogden City holds weekly meetings with developers to ensure the current standards and ordinances can be discussed.

3 Design Requirements

The objective of the Ogden City storm water design requirements is to ensure that all storm water infrastructure developments and improvements within the City are consistent with the City's Storm Drain Master Plan and will:

- Minimize the damage and inconvenience of flooding;
- Provide drainage systems which continue to provide benefit over the long term;
- Minimize the expense of maintaining the drainage facilities within the City;
- Reduce non-point source pollution;
- Minimize new impacts on engineered and natural drainage systems;
- Prevent or reduce impacts to stream and river ecosystems.

To accomplish this, storm water design and construction methods must adequately address potential problems which may arise throughout the project.

3.1.1 Basic Storm Water Management Design Criteria

Storm water management design within Ogden City shall account for the hydrologic, hydraulic, and water quality standards specified within this Manual. Furthermore, storm water management practices shall be designed based on site-specific conditions and include a waterwise landscape plan with a purpose of enhancing storm water infiltration, improving the site stabilization against erosion, and improving the community's aesthetics. Operation and maintenance requirements of any proposed storm water management practice must be considered and included within the design proposal.

Storm water management design must strive to maintain compatibility and minimize interference with existing drainage patterns; control flooding of property, structures and roadways for design flood events; and minimize potential environmental impacts on storm water runoff. Developers, contractors, and engineers performing work within the City must make appropriate efforts, to the Maximum Extent Practicable (MEP), to ensure that storm water leaving the site does not pollute, deposit sediment, or cause any other degradation or erosion to the existing natural condition of the site or downstream and adjacent sites. In summary, basic storm water management design shall be based on the following factors which are described in greater detail throughout this Manual. Appendix A includes an Executive Summary of Minimum Design or Submittal Requirements which outlines some minimum design or submittal requirements identified within this Manual. The tables in Appendix A may not be a full representation of Ogden City's storm water design requirements and therefore should be used in conjunction with this Manual, Ogden City Engineering Standards, and Municipal Codes.

- Site Design Feasibility:** Specific storm water management practices for a site shall be chosen based on the physical conditions of the site and the intended site use. Some factors that should be considered are site size, topography, terrain, slopes, and subsurface conditions such as soil types and depth to groundwater table. Environmental factors such as the site location in relation to environmentally sensitive areas and potential pollutants that could be discharged from the site should also be considered as these will play a role in the storm water quality design.
- Hydrologic Control Requirements:** All storm water management practices shall be designed such that the specific storm frequency storage volumes as identified in this Manual are met, unless the City Engineer grants the applicant a waiver or the applicant is exempt from such requirements. In addition,

if hydrologic or topographic conditions warrant greater control than that provided by the minimum control requirements, Ogden City reserves the right to impose any and all additional requirements deemed necessary to control the volume, timing, quality, and rate of runoff.

- C. **Hydraulic Considerations:** Storm water conveyance shall be designed with adequate capacity based on the site hydrologic assessment and to allow for the maximum removal of pollutants and reduction in flow velocities. This shall include, but not be limited to:
 - 1. Maximizing of flow paths from inflow points to outflow points;
 - 2. Protection of inlet and outfall structures;
 - 3. Elimination of erosive flow velocities;
- D. **Water Quality Requirements:** Every development shall have an acceptable form of storm water quality treatment in accordance with [Section 3.5](#) of this Manual, and any other federal, state, and local regulations. Qualifying developments are required to incorporate a basic form of storm water treatment utilizing practices such as infiltration, evapotranspiration, or re-use. Sites with high-use, high-sensitivity, or high pollutant potential are required to incorporate a more aggressive form of pretreatment. Specifications in [Section 3.5](#) will designate the water quantity and quality treatment criteria that apply to an approved storm water management facility. The final design and construction of storm water facilities within the City must always comply with the CWA, “to reduce the discharge of pollutants to the maximum extent practicable.” In the event there is a discrepancy between the CWA and this manual, the CWA will govern.
- E. **Waterwise Landscape and Site Stabilization Plan:** All storm water management practices must have a waterwise landscaping and site stabilization plan to enhance storm water infiltration, help prevent erosion, and improve the community’s aesthetics. This plan shall detail both the vegetation or stabilization measures to be installed as well as how and who will manage and maintain the proposed design. This plan should be prepared by a registered landscape architect.
- F. **Long-Term Storm Water Management (LTSWM):** All storm water treatment practices shall have an enforceable Long Term Storm Water Management (LTSWM) Agreement which includes a LTSWM Plan identifying critical operation and maintenance components of the storm water management facility to ensure the system functions as designed post-construction.

3.2 Site Design Feasibility

Site-specific and project-specific characteristics such as rainfall, climate, location, land use, topography, soils, slopes, terrain, and other relevant information may impact the effectiveness and performance of a storm water facility and should be considered in the design. Therefore, site-specific design decisions from a licensed professional will be required for all storm water management designs within Ogden City. One of the most critical factors in designing storm water infrastructure is understanding what is below the ground surface. This can be revealed in a subsurface investigation.

3.2.1 Subsurface Investigation

A subsurface investigation and geotechnical evaluation to determine site characteristics below the ground surface such as depth to groundwater table, soil type(s), and infiltration rates will be required for all storm water management facilities intended to detain, retain and/or infiltrate water on site.

3.2.1.1 Depth of Groundwater

Shallow groundwater may impact the performance of certain storm water management facilities. Therefore, the depth of groundwater must be identified for all storm water management designs. The depth to the groundwater table can rise or fall depending on the time of year. Typically, groundwater levels are highest during late winter and spring due to snowmelt and increased rain events. The design professional must assume and state a maximum expected groundwater elevation to be used in the design of any storm water management facilities on the site. Storm water control measures intended to detain, retain and/or infiltrate water on site shall have an appropriate groundwater depth to ensure the control measure functions as designed. Storm water control measures which are infiltration dependent must have a bottom elevation of no less than two feet (2 ft) from the highest anticipated groundwater depth.

3.2.1.2 Geotechnical Evaluation of Site-Specific Soils

If a storm water management facility depends on the hydrologic properties of soils (e.g., infiltration basins), then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be appropriate to determine the suitability and distribution of soil types present at the location of the storm water control measure.

3.2.1.2.1 Infiltration Rates

Storm water management facilities which are designed to infiltrate storm water shall require submittal of a soils report and an infiltration rate to show that water will infiltrate as intended and required by the standards within this Manual. A professional geotechnical engineer, geologist, or soil scientist licensed in Utah must identify the site-specific soils through a geotechnical evaluation. Planned retention basins must have native soil below the proposed basin identified in accordance with the Unified Soil Classification System (USCS) ASTM D4318. Therefore, native materials below the storm water facility as well as any topsoil or landscaping material that will be placed shall be evaluated to determine a true post-construction infiltration rate. In the event the soil has been identified by a licensed professional, then the assumptions for saturated infiltration rate can be used from the Utah City Engineers Association (UCEA). This information is provided in Table 1.

In the event the owner does not accept the values listed in Table 1 or the required retention volume is claimed to be infeasible based on an infiltration rate in Table 1, then the developer must perform testing of in situ soils. A double ring infiltrometer test in accordance with ASTM D3385 and a hydraulic conductivity test in accordance with ASTM D5856 shall be required. All additional tests must be paid for by the developer and the results must be certified by a licensed engineer from the State of Utah. The results of any testing must be submitted to the City for review and approved by the City Engineer.

Table 1: Design Infiltration Rate per UCEA

NRCS Hydrologic Soil Group	Typical Soil Texture	Saturated Infiltration Rate (mm/h)	Saturated Infiltration Rate (in/h)	Porosity	Field Capacity
A	Sand	200	8.0	0.437	0.062
A	Loamy Sand	50	2.0	0.437	0.105
B	Sandy Loam	25	1.0	0.453	0.190
B	Loam	12.7	0.5	0.463	0.232
C	Silt Loam	6.3	0.25	0.501	0.284
C	Sandy Clay Loam	3.8	0.15	0.398	0.244
D	Clay Loam & Silty Clay Loam	<2.3	<0.09	0.465	0.325
D	Clay	<1.3	<0.05	0.475	0.378

3.2.2 Water Quality Considerations

Both new development and redevelopment projects can have an impact on storm water quality and the quality of storm water discharge can vary greatly depending on the type of site use. Identification of the land use as well as a description of the intended site use will be required for all proposed projects. For the purposes of this Manual, the land use may be identified as one of the following:

- **Small-Scale Residential:** Includes individual or single-family homes as well as multifamily properties that have less than or equal to four (4) units.
- **Large-Scale Residential:** Includes multi-family, townhome, or apartment buildings that have greater than four (4) units.
- **Commercial:** Any development and/or structure constructed mainly for the purposed of conducting business, including but not limited to retail stores, restaurants, shopping centers, business offices, gas stations, etc.
- **Industrial:** Includes any development involving the use of premises (land and buildings) for manufacturing, processing, bulk storage, warehousing, servicing, and repair activities, etc.
- **Institutional:** Any development and/or structure constructed for the operation of hospitals, schools, libraries, auditoriums, museums, and public/government offices.
- **Mixed-Use:** A type of development that blends multiple uses, such as residential, commercial, industrial, or institutional into one space, where the functions of the different uses are to some degree physically and functionally integrated.

A site-specific assessment must be conducted to evaluate what pollutants are known to be discharged or have the potential to be discharged from the site based on the site use. Best Management Practices (BMPs) must be selected and designed in accordance with [Section 3.5](#) to address pollutants known to be discharged or have potential to be discharged from the site.

3.2.2.1 High-Use, High-Sensitivity, or High Pollutant Potential Sites

An assessment shall be conducted for all projects to identify if the site is identified as high-use, high-sensitivity, or having a high potential for storm water contaminants. [Section 3.5.1.2](#) of this Manual defines criterion that must be considered in this assessment. If identified as a high-use, high-sensitivity, or high pollutant potential site, then submittal documents must include criteria which established this identification and Ogden City water quality design standards must be incorporated into the design.

3.3 Hydrologic Design Standards

The area of the watershed shall be used to determine the amount of storm water runoff generated before and after construction. The Rational Method (or other method as approved by the City Engineer) shall be used in computing storm water runoff. The rational method can be used for sites under 200 acres. Computer programs that use similar hydrologic modeling methods can be used to model the rainfall-runoff process, but care should be taken to make sure modeling methods are used correctly. The City Engineer must approve all computer programs and methods before they are used or accepted.

3.3.1 Rational Method

Q=CiA		Equation 1
Q	=	Peak rate of runoff in cubic feet per second (cfs) per acre
C	=	Runoff coefficient
i	=	Average rainfall intensity in inches per hour (in/hr) for the time of concentration (Tc) for a selected frequency of occurrence or return period.
A	=	Drainage area in acres (must be less than 200 acres)
Tc	=	The rainfall intensity averaging time in minutes, usually referred to as the time of concentration, equal to the time required for water to flow from the hydraulically most distant point in the watershed to the point of design

3.3.1.1 Runoff

Post-construction storm water runoff must be equivalent to or less than the normal historic flow (pre-development flow data) of the development. In lieu of proof of historic flow, the Developer may assume a maximum allowable site runoff of 0.1 cubic feet per second (cfs) per acre.

3.3.1.2 Runoff Coefficient

Table 2 provides typical ranges for the Rational Method Runoff Coefficient. The presented C-values are typical for return periods of 2 – 10-year storms with the higher values for the larger design storms. Judgement must be used to select the appropriate C-value within the range for the land use. Generally, larger areas with permeable soils, flat slopes, and dense vegetation should have the lower C-value; and smaller areas with low permeability soils, steep slopes and sparse vegetation should be assigned higher a C-value.

Table 2: Runoff Coefficient (C) for Rational Method

Type of Drainage Area	C-Value	Surface Characteristics	C-Value
Business:		Lawns:	
Downtown	0.70 – 0.95	<i>Course Textured Soils (sand > 85%)</i>	
Neighborhood	0.50 – 0.70	Slope: Flat, 2%	0.05 – 0.10
		Slope: Average, 2-7%	0.10 – 0.15
Residential:		Slope: Steep, >7%	0.15 – 0.20
Single-Family	0.30 – 0.50	<i>Fine Textured Soils (clay > 40%)</i>	
Multi-Units, Detached	0.40 – 0.60	Slope: Flat, 2%	0.13 – 0.17
Multi-Units, Attached	0.60 – 0.75	Slope: Average, 2-7%	0.18 – 0.22
Suburban	0.25 – 0.40	Slope: Steep, >7%	0.25 – 0.35
Apartment Dwelling	0.50 – 0.70		
		Other Surfaces:	
Industrial:		Asphalt	0.70 – 0.95
Light	0.50 – 0.80	Concrete	0.80 – 0.95
Heavy	0.60 – 0.90	Brick	0.70 – 0.85
		Gravel	0.35 – 0.45
Parks, Cemeteries	0.10 – 0.25	Drives and Walks	0.75 – 0.85
Railroad Yard	0.20 – 0.35	Playgrounds	0.20 – 0.35
Unimproved	0.10 – 0.30	Roofs	0.75 – 0.95

3.3.1.3 Time of Concentration

The time of concentration shall be calculated using the method found in the *United States Department of Agriculture (USDA), Soil Conservation Service (SCS) Technical Release 55*. The minimum allowable time of concentration to be used in runoff calculations shall be 10 minutes.

3.4 Hydraulic Design Standards

Storm water that falls on site of any proposed development site shall not drain directly into any canal, irrigation ditch, or subdrain system. All runoff leaving a newly developed or redeveloped site should be evaluated for detention or retention in a storm water storage facility prior to outlet into any major water course.

3.4.1 Storm Conveyance System Standards

All storm water conveyances within Ogden City shall be designed to convey the 10-year 24-hour frequency storm.

3.4.1.1 Pipe Main Sizing, Material, and Strength

Pipe size shall be determined by required capacity but in no instance shall the minimum size be less than 15 inches (15") in diameter within the City Right-of-Way. Allowable storm water pipe material for all projects within the Ogden City Right-of-Way shall be RCP (Reinforced Concrete) - Class III or greater. Refer to Table 3 for further details on RCP strength class requirements within the City. PVC (Polyvinyl Chloride) - SDR 35 and HDPE (High Density Polyethylene) smooth interior walled pipe can be used for service laterals only from private property.

Table 3: RCP Strength Class Requirements

Pipe Diameter (in)	Fill Height in Feet				
	< 2	2 – 3	3 – 9	9 – 13	13 – 20
15	Not Permitted unless approved by the City Engineer AND always strength class V	IV	III	IV	V
18					
21		III			
24					

3.4.1.2 Clearances and Cover

Vertical clearance between storm water conveyance systems and other utilities shall be at least 18 inches (18"). Closer tolerances require reinforcement, concrete cradle, or other acceptable separation. Reinforcement shall be as per the current specifications. Minimum cover required for storm drain mains shall be two feet (2') for RCP. Cover over underground utilities and between railroad tracks or roadways shall be sufficient to adequately protect such utilities from potential loading of track or roadway both during construction and after final finished surfacing. Should cover be insufficient to adequately protect the utility, encasement or casings shall be provided to protect affected utility.

3.4.1.3 Slope, Drainage Velocity, and Erosion/Debris Protection

High storm water flow velocities have the potential to erode both manmade and natural storm water conveyance systems. Therefore, peak flow velocities must be analyzed for all developments and appropriate controls must be utilized to protect the storm water conveyance system both on-site and in downstream areas. Peak velocities for all proposed storm water conveyances, existing storm water conveyances that may be impacted by the proposed development, and all site storm water outfalls shall be included in the drainage calculations for both public and private storm sewer systems.

3.4.1.3.1 Minimum Drainage Velocities

Storm conveyance mainline grades shall provide a minimum velocity of three feet per second (3 ft/sec) at full flow, or a minimum velocity of two feet per second (2 ft/sec) at design flow, whichever requires the greater slope. Refer to Table 4 for examples in minimum pipe slopes for storm pipes flowing full. Grades less than what is listed in Table 4 may be acceptable upon submittal and approval of a detailed hydraulic analysis proving the minimum velocity can be met.

Table 4: Example Minimum Pipe Slope in Storm Pipes Flowing Full

Pipe Size (Inch)*	Minimum Slopes	
	Concrete (n = 0.013)	Full Pipe Flow (cfs)
15	0.32%	3.69
18	0.25%	5.30
21	0.21%	7.33
24	0.17%	9.41
Note: Pipes 24" diameter and larger must be approved by the City Engineer.		

3.4.1.3.2 Maximum Drainage Velocities

The storm water conveyance system shall convey the post development peak flow rate peak drainage velocity from the 10-year 24-hour storm event without causing erosion of the system. In no case shall storm water flow velocities exceed 20 feet/second (20 ft/sec) in all sections of all pipes. A design for energy dissipation will be required and must be approved by the City Engineer for any flow velocities exceeding nine feet per second (9 ft/sec) or if there are changes in flow directions larger than 45 degrees (45°).

When a vegetative or rip-rap lined channel or swale is to be used to convey storm water either on-site or in downstream areas which receive storm water discharged from the site, the channel shall be analyzed and designed to convey the concentrated surface runoff without damage from erosion, deposition, or flooding. Velocities shall also be designed to be non-erosive at the re-entry into the natural stream or downstream channel. An outlet velocity of six feet per second (6 ft/sec) or less is generally considered to be non-erosive. The downstream receiving channel or stream may still need stabilization if site soil conditions require in order to prevent scour or erosion. In cases where the outlet velocity is greater than six feet per second (6 ft/sec), the downstream receiving channel or stream must receive adequate protection against erosion using erosion prevention practices or energy dissipation devices.

3.4.1.3.2.1 Storm Water Outfalls and Downstream Analysis

Excessive velocities may increase the potential for erosion where the system outfalls. Storm water outfalls of any newly proposed development must be designed such that the exit velocity for the peak design flow is nonerosive for the existing downstream conditions. Energy dissipation devices may be required to reduce velocities of concentrated storm water discharge points. If outfall velocities of newly proposed developments indicate that there may be erosion of the receiving conveyance system, then downstream improvements to mitigate erosion may be required at the discretion of the City Engineer.

Stability conditions beyond the property boundary should also be considered. Both capacity and surface conditions of downstream receiving channels shall be analyzed for adequacy in conveying the expected flow and storm water velocity to prevent flooding and erosion. The designer must analyze the storm water conveyance system using acceptable hydrologic and hydraulic methodologies to the defined limit of analysis. The limits of analysis establish how far downstream the designer must verify the adequacy of the storm water conveyance system. The channel protection analysis is carried to a point where:

1. The site's contributing drainage area is less than or equal to 1.0% of the total watershed area draining to a point of analysis in the downstream conveyance system; or
2. The site's peak flow rate from the 10-year 24-hour storm event is less than or equal to 1.0% of the existing peak flow rate from the 10-year 24-hour storm event prior to the implementation of any storm water quantity control measures.

3.4.1.3.3 Trash Racks (Debris Grates)

Trash racks or debris gates are required on storm systems when there is a risk of debris clogging the system, which can cause flooding, safety risks, damage equipment, and harm the environment. A trash rack is required at the transition from open storm systems (ponds, channels, swales, etc.) to the downstream storm culverts. Trash racks should be designed to follow local or state design criteria and must be in conformance the most current version of the Utah Chapter of American Public Works Associations (APWA) Standards. They should also be securely fastened to the inlet and be able to withstand the forces exerted on them during high flow periods.

3.4.2 Manhole Design Standards

Storm drain manholes shall be installed at all changes in pipe size, slope, or alignment or at a junction with other storm drain lines. Storm drain manholes shall be designed and installed at a maximum spacing of 400 feet (400'). No drop manholes shall be allowed. Storm sewer manholes within the Right-of-Way shall be a minimum of five feet (5') in diameter.

3.4.3 Storm Water Storage Facilities

All storm water which falls on a development under consideration shall be routed through a storm water storage facility designed and sized in accordance with this Manual. These facilities shall blend in with the overall theme of the open space while serving the intended purpose of storing and/or treating storm water and minimizing runoff flow. All storm water storage facilities must include a controlled emergency overflow that safely conveys excess storm water to a public Right-of-Way or public drainage way, or other acceptable water course without damaging or adversely impacting private or public property. Controlled emergency overflow structures shall have a minimum freeboard as identified in Table #. Standing water shall not be allowed to rise above eight inches (8") in the parking areas. The use of pumps in storm water facilities will not be allowed due to excessive and continual maintenance costs.

A subsurface investigation to verify depth of groundwater, soil types, and infiltration rates as required based on the storage facility design and in accordance with [Section 3.2.1](#) of this Manual is required for all storm water storage facilities. The volume requirements of a storm water storage facility shall not be reduced based on evaporation or infiltration due to percolation. In other words, neither evaporation nor infiltration may not be used as outflow when calculating the storm water storage capacity. Other public utilities (e.g. water, sewer, power, natural gas, etc.) shall not be allowed to pass through a storm water storage facility and should be a minimum of five feet (5') from the outside edge of the facility.

3.4.3.1 Regional Storm Water Storage Facilities

A regional storm water storage facility requires the approval of the City Engineer. If a regional storm water storage facility is approved, it shall be located on a separate parcel which complies with Ogden City Zoning Ordinance or within an easement dedicated to Ogden City. The Owner shall provide adequate maintenance and allow access to the facility in accordance with [Section 3.7.1.1](#). A "low flow" channel shall be provided for a two-year 24-hour storm event in all regional detention facilities.

3.4.3.2 Above Ground Storm Water Storage Facilities

Above ground storm water storage facilities shall blend in with the overall theme of the open space while serving the purpose intended by the design professional and Ogden City. All above ground storm water storage facilities shall be landscaped and include a LTSWM Plan in accordance with [Section 3.7.1](#) of this Manual. Side slopes of any above ground storm water storage facility shall be 3:1 (3H:1V) or 33.3% maximum. All above ground storm water storage facilities shall provide a forebay or place for debris and other polluted elements to settle and filter out upstream of the storm water storage facility. All above ground storm water facilities within landscaped or open space areas must have a means for preventing vehicle encroachment (e.g., curbs, tire bumpers, boulders, bollards, etc.).

3.4.3.3 Underground Storm Water Storage Facilities

A Manufactured Treatment Device (MTD) which meets the requirements of [Section 3.5.3.1](#) must be installed at each inlet for all underground storm water storage facilities. Developments may utilize pipes or tanks for underground storage, but gravel void space will not count towards required storage volume unless the system is designed and constructed in accordance with the manufacturer's specifications and requirements and void space specifications for aggregate used in the subsurface system are provided in the design submittal.

In accordance with [Section 3.7.1.1](#), the full extents of the underground storage system shall be accessible through manholes, inlets, inspection ports, or by other outside entry means for inspection, maintenance, or repair of the facility.

3.4.3.4 Detention Facilities

Detention facilities shall be designed and sized to detain the volume of a 25-year storm and shall have an irremovable metered outflow which meets the runoff requirements of [Section 3.3.1.1](#). The minimum allowable discharge orifice diameter is three inches (3"). Control structures shall provide a means for an underground detention facility to maintain operation in emergency flow conditions if a portion of the structure becomes clogged or otherwise inoperable. The cross slope within any storm water detention facility shall be steep enough to provide adequate drainage to the nearest outlet structure to prevent standing water and stagnation. Under no circumstances shall the slope be less than 1% across any portion of a storm water detention facility. All site that are identified as Large-Scale Residential, Commercial, Industrial, Institutional, or Mixed-Use per [Section 3.2.2](#) and intend to discharge storm water into the Ogden MS4 must incorporate Water Quality Design in accordance with [Section 3.5](#). All detention systems must discharge directly to an acceptable City-owned storm water conveyance and must drain within 24 hours.

3.4.3.5 Retention Facilities

Retention facilities shall be designed and sized to retain the 100-year 24-hour storm. Retention is a feasible option when the soil where the retention is planned has "saturated infiltration rate" such that the volume of the 100-year 24-hour storm can be drained in 72-hours or less. Retention facilities are required when City storm main lines are not within proximity for connection or when connection to public storm system is infeasible, as determined by the City Engineer. Retention facilities may also be required in cases where water quality treatment standards are not met.

3.4.3.6 Sumps or Injection Wells

Sumps or injection wells shall only be allowed when approved by the City Engineer and only when no available outlet exists. Sumps shall be designed for a 100-year 24-hour duration storm event. The volume of the 100-year 24-hour storm must be drained in 24-hours or less . The capacity of sumps shall not include gravel void space. Any flooding involved with the sump shall be the responsibility of the Owner, and at no time shall Ogden City be responsible for any damage caused by a sump.

3.4.4 Storm Drain Catch Basins, Cleanouts and Inlets (Roadway)

Storm Drain Catch Basins or Inlets shall generally be located on both sides of the street and shall be required at all changes in pipe size, slope, alignment or at any junctions with other storm pipes (when a manhole is not applicable). Cleanouts shall be installed on all roof drains which connect to an inlet box. Inlet box capacity shall be calculated by the Developer's engineer and submitted to Ogden City. Inlet spacing shall be designed to collect a 10-year 24-hour design storm but shall not exceed 350 feet (350'). The design calculations must consider the slope across the inlet, road cross slope, inlet area and shape, and efficiency of the inlet being used. Locate all inlet boxes outside of any point of curvature, drive approach, intersection, pedestrian ramp, or other location which may result in unsafe driving conditions or excess pollutant/traffic loading.

3.4.5 Roadway Drainage

Roads must provide adequate drainage for a 100-year 24-hour flood discharge within the street Right-of-Way. The drainage contained in the roadway shall be to the standards listed in the Table 5. The depth of flow shall not exceed the existing curb height.

Table 5: Minimum Design Frequency and Spread

Road Classification		Design Frequency	Design Spread
Collector	< 45 mph	25-year 24-hour	½ Driving Lane
	> 45 mph	25-year 24-hour	Shoulder
	Sag point	25-year 24-hour	½ Driving Lane
Local Streets	Low ADT	25-year 24-hour	½ Driving Lane
	High ADT	25-year 24-hour	½ Driving Lane
	Sag Point	25-year 24-hour	½ Driving Lane

Downhill cul-de-sacs and dead ends shall not be allowed unless approved by the City Engineer. Additional requirements will be based on factors related to each development. Special considerations shall be given to downhill “T” intersections to ensure all flooding will be contained within the Right-of-Way.

3.4.6 Flood Protection

Flood protection criteria are based on an assessment of the current condition of the downstream storm water conveyance system. The City must be consulted if the area currently experiences localized flooding. In the event the area does experience localized flooding, additional review of the conveyance system will be required, and the City Engineer may require stricter flood control design standards than what is specified in this Manual. Detention of storm water or downstream improvements may be incorporated into the approved land-disturbing activity to meet this criterion, at the discretion of the City Engineer.

3.5 Water Quality Design Standards

In accordance with the Utah DWQ MS4 Permit, Ogden has developed storm water quality standards to minimize impacts to water quality from new development and redevelopment projects. Ogden’s water quality design standards are intended to mimic natural hydrology by increasing pervious surfaces and retaining storm water on site. These design standards have a goal to slow down urban runoff, provide infiltration closer to the source, and install structural storm water treatment to reduce the likelihood of contaminants getting introduced into the conveyance system and downstream water bodies.

While all developments shall consider storm water quality within the design, all projects that meet the qualifying criteria described in [Section 3.5.1](#) are required to provide water quality controls in accordance with this section of the Manual. In addition, engineers and developers shall refer to Ogden City Municipal Code 9-7C as well as “A Guide to Low Impact Development within Utah” (Utah LID Guide) as cited in the References. These documents provide additional information and guidance on implementation of Ogden City water quality design standards.

It should be noted that water quality considerations do not replace or substitute for water quantity or flood management requirements discussed in other sections of this Manual. The water quality controls may be incorporated into the design of structures intended for flow control; or water quality control may be achieved with separate control measures.

3.5.1 Developments Required to Meet Water Quality Design Standards

Unless deemed infeasible based on criteria listed in [Section 3.5.3](#), judged by Ogden City to be exempt, or granted a waiver, all developments which meet one or more of the qualifications below shall incorporate the storm water quality standards defined in this Manual.

All developments identified as either large-scale residential, commercial, industrial, institutional, or mixed-use which plan to discharge storm water into the Ogden City MS4 must install a manufactured treatment device (MTD) prior to storm water discharge. Furthermore, all sites which incorporate an underground storm water storage facility must install an MTD upstream of the storage. When the underground storage has multiple inlets, an MTS must be installed at each inlet. All MTDs must meet the requirements of [Section 3.5.3](#).

Table 6 below summarizes the water quality design standards required for various types of projects and project criteria. Further explanation can be found in the referenced sections within Table 6.

Table 6: Project Criteria and Corresponding Water Quality Design Standards

Project Criteria	Section Reference	LID BMP* Per Section 3.5.2.1	MTD Per Section 3.5.4
Sites requiring coverage under UPDES Permit UTRC00000, UTRH00000, or UTR000000.	3.5.1.1	✓	
Sites identified as high-use, high-sensitivity, or having a high pollutant potential.	3.5.1.2	✓	✓
Large-scale residential, commercial, industrial, institutional, and mixed-use sites that discharge storm water into the Ogden MS4.	3.2.2 3.4.3.4		✓
Sites which incorporate underground storm water storage facilities.	3.4.3.3		✓ (upstream of storage)
*Sites which require LID BMPs but are claiming infeasibility per Section 3.5.3 must install an MTD prior to discharge.			

3.5.1.1 UPDES Permitted Projects

All sites or projects which are required to gain coverage under any of the permits identified in Table 7 shall incorporate Ogden City water quality standards.

Table 7: UPDES Permits In which Ogden City Water Quality Standards are Required

Permit No.	Permit Title
UTRC00000	General Permit for Storm Water Discharges from Construction Activities
UTRH00000	General Storm Water Permit for Construction Activity Connected with Single Lot Housing Projects
UTR000000	Multi-Sector General Permit (MSGP) for Storm Water Discharges Associated with Industrial Activities

[Section 4](#) of this Manual provides additional details on each of these UPDES permits which may be required. For further information on UPDES permits, visit the DWQ Storm Water Permits section of Utah DEQ website.

3.5.1.2 High-Use, High-Sensitivity, or High Pollutant Potential Sites

All developments which meet one or more of the criteria below have been identified by the City either high-use, high-sensitivity, or having a high potential for storm water contaminants and shall incorporate Ogden City storm water quality standards.

1. Sites which discharge directly into a jurisdictional wetland or local water body.
2. Expected average daily traffic counts exceeding 100 vehicles per 1,000 square feet of gross building area or any site with more than six (6) parking stalls.
3. Petroleum storage or transfer areas (excluding delivered heating oil), including gas stations with underground storage tanks.
4. Road intersections with a measured average daily traffic of 25,000 vehicles or more on the main roadway and 15,000 or more on any intersecting roadways. Projects proposing primarily pedestrian or bicycle use improvements are excluded.
5. Agricultural pesticide, herbicide, and fertilizer storage, use, filling, and mixing areas, dairy farms and animal feed lots with more than 10 animal units, farm operations and manure piles.
6. Airport maintenance and fueling sites.
7. Auto operations and fleet vehicle maintenance facilities (commercial), including dealership maintenance departments, tire shops, auto body stores, engine repair, rust proofing shops, oil and lube shops, vehicle rental with maintenance and car washes.
8. Boat building and refinishing.
9. Chemical reclamation facilities.
10. Chemigation wells.
11. Concrete, asphalt, and tar companies.
12. Dry cleaners, with onsite chemicals.
13. Embalming services.
14. Dump sites and recycling centers.
15. Maintenance garages.
16. Food processing, meat packing, and slaughterhouses.
17. Furniture stripping, painting, and finishing businesses.
18. Industrial manufacturers of: chemicals, pesticides, herbicides, paper products, leather products, textiles, rubber, plastic, fiberglass, silicone, glass, pharmaceuticals, and electrical equipment, etc.
19. Industrial waste disposal/impoundment areas.
20. Junk and salvage yards.
21. Landfills and transfer stations.
22. Machine shops, metal plating, heat treating, smelting, annealing, and descaling facilities.
23. Mining operations including radiological, sand and gravel excavation and processing.
24. Municipal wastewater treatment plants.
25. Railroad yards.
26. Residential pesticide, herbicide, and fertilizer storage, use, filling, and mixing areas.
27. RV waste disposal stations.
28. Salt and salt-sand piles.
29. Septic tank drain field systems.
30. Sumps or injection wells.
31. Toxic chemical storage and oil pipelines.
32. Wood preservative treatment facilities.
33. Other uses determined by Ogden City Engineer.

3.5.2 Water Quality Treatment Requirements

Storm water from new development and redevelopment projects which meet one or more of the criteria identified in [Section 3.5.1](#) must be treated per the requirements identified in this Section. An engineered plan showing design, calculations and/or testing shall be submitted to show the effectiveness of the treatment.

3.5.2.1 Basic Storm Water Treatment: Low Impact Development (LID) Approach

A Low Impact Development (LID) approach is a basic form of storm water treatment which promotes the implementation of engineered systems or Best Management Practices (BMPs), either structural or natural, that use or mimic natural processes to promote infiltration, evapotranspiration and/or harvest¹ and reuse storm water on site to protect water quality.

Projects which are required to incorporate water quality design standards per [Section 3.5.1](#) must route all storm water which falls on the site through an approved LID BMP. These projects must also retain and manage the 80th Percentile Water Quality Volume (WQV) on site. The 80th Percentile WQV is described in further detail in [Section 3.5.4](#).

This Manual provides LID requirements specific to Ogden City. Additional guidance for implementing LID can be found in DWQ's LID controls can be found in *A Guide to Low Impact Development within Utah* (Utah LID Guide), available on DWQ's website.

3.5.2.1.1 Selecting Low Impact Development (LID) Best Management Practices (BMPs)

The Utah LID Guide has flow charts to aid in LID BMP selection. LID BMP recommendations contained within the flow charts do not necessarily rule out consideration of other BMPs. Furthermore, site-specific factors such as local climate, soil conditions, vegetation, and slopes may impact the performance of a LID BMP. Therefore, site-specific design decisions from a licensed professional will be required. Project decisions made regarding LID BMPs must be documented and provided to the City for review and acceptance. A site utilizing LID BMP(s) can apply for a reduction in the monthly storm water charges.

3.5.2.1.2 Ogden City Approved LID BMPs

Not all BMPs listed in the Utah LID Guide are accepted in Ogden City. Table 8 includes the approved LID BMPs within the City.

¹ Since 2010, rainwater harvesting is legal in the State of Utah. Depending on the volume of rainwater collected and stored for beneficial use, the Permittee must meet the requirements of the Utah Division of Water Rights to harvest rainwater found on their website.

Table 8: Accepted LID Practices in Ogden City Pending Site Evaluation and Approval

BMP	LID BMP Category	Right-of-Way	Private Property
Rain Garden	Bioretention		✓
Bioretention Cell		✓	✓
Bioswale		✓	✓
Vegetated Strip		✓	✓
Tree Box Filter		✓	✓
Green Roof			✓
Pervious Surface	Pervious Surfaces		
Infiltration Trench	Infiltration Devices	✓	✓
Dry Well		✓	✓
Underground Infiltration Galleries		✓	✓
Harvest and Reuse			✓

3.5.3 Feasibility

Site-specific conditions may dictate the feasibility of the use of LID. If meeting the 80th percentile WQV retention standards through LID is infeasible, a rationale shall be provided for the use of alternative water quality design criteria. The new or redevelopment project must document and quantify that infiltration, evapotranspiration, and rainwater harvesting have been used to the maximum extent feasible and that full employment of these controls are infeasible due to constraints. In the event the LID is not able to be utilized there must be documentation submitted using, but not limited to, one of the following criteria with the associated justifications:

- High Groundwater
- Contaminated Groundwater
- Drinking Water Source Protection
- Soil Conditions (e.g., low infiltration rates)
- Excessive Slopes
- Accessibility
- Excessive Costs
- Or Other Justifiable Constraint

3.5.3.1 Storm Water Manufactured Treatment Device (MTD)

All developments which have been identified as either high-use, high-sensitivity, or having a high potential for storm water contaminants in accordance with [Section 3.5.1.2](#) must incorporate a manufactured treatment device (MTD) in addition to the LID BMPs required as part of [Section 3.5.2.1](#).

Furthermore, if a development meets any of the criteria of [Section 3.5.1](#) but has determined that LID BMPs are infeasible, then an MTD shall be required to improve water quality prior to discharging storm water from the site.

Storm water treatment for oil and sand shall be provided at all sites not utilizing a landscaped area to route the water prior to discharge into the system. Snouts are not an acceptable solution for oil and sand separation.

3.5.3.1.1 Manufactured treatment device (MTD) Performance Requirements

To be approved for use in Ogden City, MTDs shall be:

1. Sized and designed to remove 50% of total suspended solids (TSS) with a median particle size of 75 microns.
2. Verified by testing through New Jersey Corporation for Advanced Technology (NJCAT) program.
3. Certified by New Jersey Department of Environmental Protection (NJDEP) under the most updated procedures and protocols. NJDEP Certification shall be submitted to the City.
4. Sized to treat the prescribed Water Quality Flow rate (WQF) described in [Section 3.5.4.2](#) at or below the approved design hydraulic loading rate.
5. Designed according to the specific performance criteria outlined in this Manual.
6. Constructed properly and maintained appropriately by the property owner in accordance with [Section 3.7](#) of this Manual and Municipal Code 9-7C.

3.5.4 80th Percentile Runoff Volume – Water Quality Volume (WQV)

If required to incorporate storm water quality design standards per the criteria described in [Section 3.5.1](#), then all storm water which falls within the project’s limits of disturbance must be routed through an approved basic storm water treatment and/or manufactured storm water treatment as required. Furthermore, all new development and redevelopment projects required to incorporate water quality standards shall retain and manage the 80th percentile runoff volume or water quality volume (WQV) on site. This objective must be accomplished by the use of practices that are designed, constructed, and maintained to infiltrate, have evapotranspiration, and/or harvest and reuse rainwater. The WQV may differ for new development and redevelopment sites as identified below.

3.5.4.1.1 New Development Projects

New development projects that meet the criteria of [Section 3.5.1](#) must manage the volume of runoff generated within the project’s full limits of disturbance.

3.5.4.1.2 Redevelopment Projects

Redevelopment projects that meet the criteria of [Section 3.5.1](#) must provide a site-specific and project-specific plan aimed at net gain to onsite retention or a reduction to impervious surface to provide similar water quality benefits. If a redevelopment project increases the impervious surface by greater than 10%, the project shall manage the net increase in the volume associated with the 80th percentile rainfall on-site.

3.5.4.2 WQV and WQF Calculations

WQV and WQF calculations must be submitted to the City for review and approval. The WQV can be calculated utilizing the Equation 2 below. These calculations will require the use of both the 80th percentile precipitation depths specific to Ogden City as well as the volumetric runoff coefficients described in the sections below. For further details on WQV calculations, refer to the Utah LID Guide.

$$WQV = R_v d A$$

Equation 2

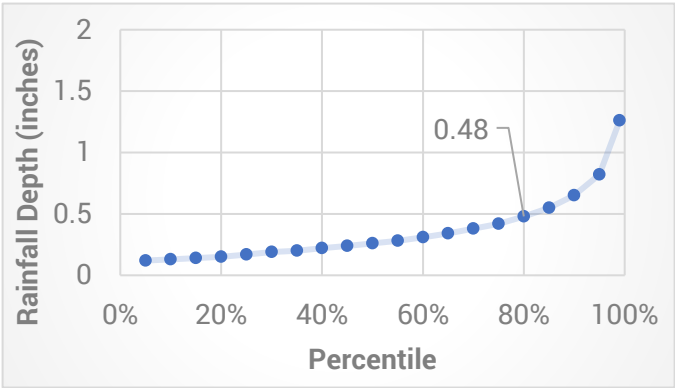
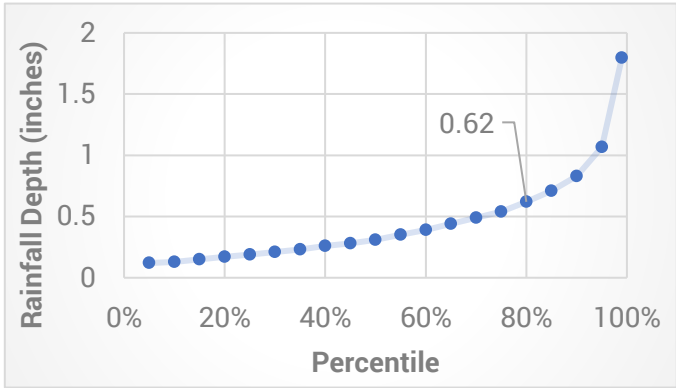
WQV	=	80 th percentile runoff volume or “Water Quality Volume” in cubic feet (cf)
R _v	=	Water quality volumetric runoff coefficient, unitless
d	=	80 th percentile rainfall depth in feet (ft)
A	=	Project limits of disturbance or BMP drainage area in square feet (sq. ft.)

WQF can be calculated utilizing the Rational Method (Equation 1) where the design storm is a 1-year 3-hour.

3.5.4.2.1 80th Percentile Precipitation Depth (d)

The 80th percentile rainfall depth represents the depth of rainfall which is not exceeded in 80 percent (80%) of all runoff producing rainfall events within the time period analyzed. In other words, 80 percent (80%) of the rainfall storm events that produce runoff will be less than or equal to this depth. Ogden City has determined the 80th percentile rainfall depth must be split into two separate regions within the City. The two separate regions, along with the associated 80th percentile rainfall depth is provided in Table 9.

Table 9: Ogden City 80th Percentile Rainfall Depths

West of Harrison Boulevard	East of Harrison Boulevard
Harrison Blvd. to west city limits, the precipitation depth has been calculated to be 0.48 inches .	Harrison Blvd. to east city limits, the precipitation depth has been calculated to be 0.62 inches .
	

3.5.4.2.2 Water Quality Volumetric Coefficient of Runoff (R_v)

The Water Quality Volumetric Runoff Coefficient (R_v) is determined based on the site’s hydrologic soil group method and the associated equation below where i represents the percent of imperviousness of the drainage area in decimal format (0.0 – 1.0).

Table 10: Volumetric Runoff coefficient equations based on the NRCS Soil Group

NRCS Soil Group	Equation to Calculate R_v	
A	$0.84i^{1.302}$	Equation 3
B	$0.84i^{1.169}$	Equation 4
C/D	$0.84i^{1.122}$	Equation 5

Waivers to Storm Water Management Requirements

There are some scenarios in which a development may be granted a waiver to storm water management requirements. Requests for waiving storm water requirements must be in writing and may only be approved by the City Engineer. Furthermore, the applicant must demonstrate to the satisfaction of the City Engineer that any variance will not result in negative impacts to downstream waterways. If a waiver is granted, the applicant will satisfy the minimum storm water requirements by means of other mitigation measures such as dedication of land, monetary contributions (fee-in-lieu), or installation of a storm water management facility in an area that currently lacks proper storm water management. Please refer to the Ogden City Municipal Code 9-7C for further details on storm water management requirement waivers.

3.6 Landscaping and Site Stabilization Standards

Landscaping and site stabilization is an important element of storm water management. Factors such as maintenance, climate, irrigation requirements, site slope and stability, and vegetation cover and selection should be considered in the landscaping plan.

Long-term landscaping maintenance shall be the responsibility of the property owner. It is recommended that low maintenance, water-wise plants, which are appropriate for Utah's climate and conditions, are utilized in landscaping designs within Ogden City. Vegetation overgrowth within a storm water control may result in blockages of flow or inhibit proper operation of the control measure. These chemicals are considered storm water pollutants and are not permitted within any storm water system.

Proper site stabilization through a well-designed landscaping and/or site stabilization plan is necessary to prevent soil erosion and ensure a storm water facility operates as intended. This is especially true for steeply graded sites. Exposed soils and other debris can be eroded during wet weather events which may result in sediment discharges that contribute to pollution of lakes, rivers, and other water bodies. Furthermore, sites with steep slopes have the potential for increased soil erosion and possible landslides when proper stabilization is not achieved. The angle of repose shall be considered for materials utilized on the surface of all slopes. Materials should be selected to prevent material discharge from designated landscaping within all areas. All sites shall be stabilized in accordance with state, federal and local regulations. In no instance shall soils on a site be left destabilized without proper storm water pollution prevention BMPs in place and regular monitoring and maintenance of said BMPs. Furthermore, in no instance shall soils on a site be left destabilized after construction is complete.

At a minimum, all storm water facilities shall be landscaped in accordance with Ogden City Standards and Municipal Codes. A landscaping and irrigation plan which includes information regarding maintenance practices, selection of appropriate plant materials, irrigation system design, and any other related item must be provided by the design professional with any storm water facility submittals and approved by the City.

3.7 Operation, Monitoring, and Maintenance Standards

Adequate long-term operation, monitoring, and maintenance is necessary and required for all storm water control measures. Operation, monitoring, and maintenance is the sole responsibility of the property owner. Any flooding caused by an improperly installed or improperly maintained storm water management facility shall be the responsibility of the Owner, and at no time shall Ogden City be responsible for any damage caused by a storm water management facility on private property.

3.7.1 Long-Term Storm Water Management (LTSWM) Agreement and Plan

All storm water management facilities shall require a Long-Term Storm Water Management (LTSWM) Agreement to ensure the system is maintained to function as designed post-construction. The LTSWM Agreement must specify the parties responsible for maintenance of all storm water facilities and shall be signed by the Developer and/or property owner and recorded against the property to account for transfer of responsibility in leases and/or deeds. The LTSWM Agreement shall be binding on all subsequent owners of land. The LTSWM Agreement shall be recorded in the Weber County Recorder's Office and shall be submitted to the City for review and approval prior to issuance of any permits for land disturbing activities.

The LTSWM Agreement must include a LTSWM Plan which meets all requirements of this Manual as well as any requirements specified in Municipal Code 9-7C. The LTSWM Agreement must be completed, reviewed, and approved by Ogden City Engineering. The approved Agreement shall be recorded at the Weber County Recorder's office on the property title and a copy of the recorded document must be provided to the Ogden City Engineering Division prior to permit issuance. The LTSWM Plan must be developed and certified by a licensed engineer from the State of Utah. Ogden City has developed a LTSWM Plan Template to assist in fulfilling the requirements of this Manual. The LTSWM Plan must include, but may not be limited to:

- A summary description of all storm water facilities, BMPs, and control measures installed or to be installed on the Property.
- Details and all appurtenance draining to and affecting the storm water facilities.
- Standard Operating Procedures (SOPs) describing the routine operation, maintenance, inspection, and reporting procedures for the storm water facilities as defined in [Section 3.7.1.2](#).

Appendix B includes the LTSWM Agreement as well as the LTSWM Plan template to be utilized to fulfil this requirement.

3.7.1.1 Accessibility

All storm water facilities and systems shall be equipped with suitable access for inspection, maintenance, and/or repair. Underground systems shall be accessible through manholes, inlets, inspection ports, or by other outside means of entry sized appropriately to allow proper maintenance for the full facility. For large above ground storm water management facilities (e.g., regional storm water storage facilities), all weather vehicular maintenance access around the entire basin (minimum 10-foot lane width) will be required. Heavy Truck (40,000 lbs.) access into the basin shall be constructed of concrete with a maximum slope of 10H:1V. Heavy Truck access to all inlet and outlet structures will be required and shall be constructed of asphalt or concrete over road base.

3.7.1.1.1 Access Easement(s)

Discharging storm water onto or through private property without the appropriate easement is strictly prohibited. Cross drainage between properties may be allowed with a written easement as approved by the City Engineer. Should the installation of a Storm Water facility require any easements to Ogden City, the Developer of such system shall convey the easements, as determined necessary by the City Engineer, by deed to Ogden City. An access easement will be required whenever public storm drains are constructed on private property. Ogden City shall be granted suitable access to inspect storm water management facilities on private properties that discharge to the MS4 to ensure that adequate maintenance is being performed. In accordance with Municipal Code 9-7C, a maintenance easement(s) may be required and shall be binding on all subsequent owners of the land served by the storm water management facility. The easement(s) will be recorded with the plan and will remain in effect even with transfer of title to the property. Should easements be necessary for the installation and maintenance of a Public Storm Sewer system, such easements shall be:

- a. Based on the pipe size, the depth of the pipe, and the amount of space needed to convey the given drainage.
- b. Extend 10 feet (10') beyond the last manhole on a line.
- c. Submitted to the City Engineer for final approval.

- d. No buildings, utilities or structures shall be erected or constructed within such easements as to interfere with the activities necessary to properly access, maintain and/or replace such lines or Storm Drain structures.

Both legal and physical access is required to all Storm Drain manholes, inlets, and facilities. Physical access shall consist of all-weather surface sufficient to provide access for all routine maintenance and repair equipment. All detention lots or easements shall be properly surveyed, and corners permanently marked prior to acceptance of improvements.

3.7.1.2 Standard Operation Procedures (SOPs)

The following SOPs must be developed by the design professional and provided to the City for review and approval for all storm water management facilities. Once approved by the City, these SOPs must be included in the LTSWM Plan and attached as addenda to the LTSWM Agreement.

3.7.1.2.1 Operations and Maintenance (O&M)

An Operation and Maintenance (O&M) SOP specific to the proposed storm water management facility is required. At a minimum this O&M SOP shall identify:

- Any operational practices to be employed to ensure proper function of the storm water management facility.
- The equipment and skills or training necessary to operate and maintain the storm water management facility.
- The parts or components of a storm water management facility that need to be maintained.
- A detailed description of how the storm water management facility shall be maintained.
- Who will be responsible for maintenance.
- The anticipated frequency of how often maintenance will be necessary to maintain proper function.

3.7.1.2.2 Inspection

An Inspection SOP specific to the proposed storm water management facility is required. The Inspection SOP shall identify:

- How an inspection is to be performed and include a checklist of facility elements that will be verified during the inspection.
- Include specific details of visual indicators which constitute proper condition for each element in the checklist as well as visual indicators that constitute maintenance necessity.

The property owner, operator, or qualified third party shall inspect and conduct maintenance at the frequency required by the O&M SOP described in [Section 3.7.1.2.1](#).

4 Permitting Requirements

There are a variety of storm water specific permits that may be required for any given project depending on the type of work being proposed and the site conditions. Furthermore, permits may be required by other agencies such as the State of Utah in addition to Ogden City permits. It is the responsibility of the developer to determine and obtain all appropriate permits required for their project. Some permits specific to storm water are described in the sections below. Even when a permit is not required, all improvements associated with new development or redevelopment projects must abide by all federal, state, and local storm water regulations.

4.1 Ogden City Storm Water Permits

Please visit the Ogden City website for additional information on permit requirements or to fill out a permit application.

4.1.1.1.1 *Right of Way Permit*

A Right of Way permit will be required for any work performed in the City right-of-way, including the connection of private development storm water infrastructure to City storm water infrastructure.

4.1.1.1.2 *Storm Water Pollution Prevention Plans (SWPPPs) and SWPPP Permits*

Any construction activity and land disturbing activity, directly or indirectly associated with construction projects, and all persons engaged in such activity within the corporate limits of Ogden City must protect the storm system from pollutants associated with the activity. The owner or operator of a construction site or project shall provide, at their own expense, reasonable protection from discharge of materials or other wastes associated with the construction activity into the city storm water system or waters of the state of Utah through the use of structural and nonstructural BMPs. **SWPPP permits and all associated SWPPP BMPs must be in place prior to any land disturbing activity.**

Any project required to obtain a Utah Pollutant Discharge Elimination System (UPDES) permit for construction activity must maintain compliance with all terms and conditions of that permit and shall submit to the City evidence of compliance with the UPDES permit upon request. Furthermore, any project required to obtain a UPDES permit for construction activity must also obtain an Ogden City SWPPP permit.

For additional SWPPP requirements, refer to the Ogden City website and the UPDES information on the DEQ DWQ website.

4.2 Utah Storm Water Permits and Programs

The State of Utah has a variety of permits or programs which may be required depending on the work being proposed, storm water management facility designs, the site conditions, or the site use. Permits or programs discussed in this section are required and administered by the State of Utah Department of Environmental Quality (DEQ) Division of Water Quality (DWQ). Additional Utah storm water permits not described below may be required. Please visit the Utah DEQ DWQ website for more information on permitting requirements.

While state permits are required and administered by the Utah DEQ DWQ, in accordance with Ogden City Municipal Codes, any person subject to a UPDES storm water discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the City prior to the allowing of discharges to the MS4. Some permits which may apply are described below.

4.2.1.1.1 General Permit for Storm Water Discharges from Construction Activities

The General Permit for Storm Water Discharges from Construction Activities (Permit No. UTRC00000) is commonly referred to as the Construction General Permit (CGP). This permit is required for all projects that disturb land greater than or equal to one acre (1 ac.) as well as all Common Plan of Development sites intended for industrial or commercial developments.

4.2.1.1.2 General Storm Water Permit for Construction Activity Connected with Single Lot Housing Projects

The General Storm Water Permit for Construction Activity Connected with Single Lot Housing Projects (Permit No. UTRH00000) is commonly referred to as the Common Plan Permit (CPP). This permit is required for all Common Plan of Development projects which are related to residential dwellings.

4.2.1.1.3 Construction Dewatering Permit

Discharging of construction dewatering (groundwater that intersects with excavation) must be permitted under UPDES Construction Dewatering and Hydrostatic Testing Permit Number UTG070000. Ogden City must be notified of any construction dewatering which is discharged to waters of the state (including Ogden City MS4) prior to discharge. Permitting is not required under UTG070000 if the construction dewatering does not leave the site (it is percolated into the ground on site).

4.2.1.1.4 Multi-Sector General Permit (MSGP) for Storm Water Discharges Associated with Industrial Activities

The Multi-Sector General Permit (MSGP) for Storm Water Discharges Associated with Industrial Activities (Permit No. UTR000000) is typically required for industrial facilities such as manufacturing facilities, mining operations, landfills, steam electric plants, automotive recyclers, waste and metal recycling, larger wastewater treatment plants, and transportation facilities.

4.2.1.2 Underground Injection Control (UIC) Program

Underground Injection Control (UIC) wells are defined in the Utah Administrative Code R317-7-2 as a bored drilled, driven or dug well or hole whose depth is greater than its largest surface dimension that is intended to distribute fluids below the surface of the ground. Underground storm water management facilities that have a primary function to infiltrate storm water into the ground (e.g., sumps, injection wells, etc.) may be classified by the State as a Class V UIC well. Owner/operators of all UIC Class V wells, including storm water drainage wells, are required by federal and state UIC regulations to submit inventory information. Review the UIC section of the UDEQ DWQ website for further information on UIC requirements to determine if a storm water management facility in your project classifies as a Class V UIC well. It is the responsibility of the Developer to ensure all storm water management facilities on their site comply with the Utah DEQ UIC program and to obtain any necessary permit or submit any necessary applications through said Program.

5 Development Submittal Requirements

5.1 Pre-Construction Submittal Requirements

Any proposed development or redevelopment must be clearly described to the City for review and approval.

5.1.1 Conceptual Storm Water Management Design Plan

A Conceptual drainage plan is recommended for all multi-lot developments and single lot developments larger than one acre (1 ac.). The intent of this conceptual planning process is to determine the type of storm water management measures necessary for the proposed project and ensure adequate planning for management of storm water runoff from future development. The conceptual plan will include sufficient information to evaluate the environmental characteristics of the project site, the potential impacts of all proposed development of the site, both present and future, on the water resources, and the effectiveness and acceptability of the measures proposed for managing storm water generated at the project site. To accomplish this goal the following information shall be included in the concept plan at a minimum:

1. Scale, north arrow, legend, title block showing project name, date, preparer's name, seal, and signature.
2. General description of the development, including location (township, range, section, subdivision and lot).
3. General description of the area including existing site conditions, existing drainage facilities (e.g., pipes, ditches, canals, washes, swales, springs), facilities (detention and retention basins), and any proposed modifications to the area drainage.
4. Existing and proposed topography (2-foot maximum contour interval) extending at least 100 feet beyond the site. Additional spacing may be required if offsite drainage is routed through the development.
5. Existing and proposed infrastructure (roads, easements, utilities, and Right-of-Way).
 - a. Location of proposed drainage facilities including storm drain pipes, inlets, manholes, cleanouts, swales, channels, and retention and detention basins.
6. Estimate of minimum depth to groundwater level on the site. This should be followed up with a soil/geotechnical analysis for verification. The soil infiltration rates can be used from the Utah City Engineers Association with soil verification from a licensed professional.
7. FEMA floodplain and floodway must be shown.
8. Existing flow patterns and paths along with proposed flow patterns and paths, if adjusted from existing flow patterns.
9. The plan must include how the development and proposed improvements conform to the Storm Drain Master Plan.
10. General description of off-site drainage features and characteristics upstream and downstream of the site and any known drainage problems which affect or can affect the site.
11. Required setbacks for structures from the center line of streams and washes, if applicable.
12. General description of existing and proposed on-site drainage structures (this should include facilities, pipes, ditches, etc.).
13. Description of the proposed facilities that will be used to manage on-site and off-site storm water runoff associated with the development.
14. General description of master planned drainage facilities and proposed drainage features.

15. Preliminary Drainage Calculations if required by the City Engineer.

5.1.2 Final Storm Water Management Design Plan

The following information shall be included in all final storm water design plans. Additional information may be required as the City deems necessary. This plan shall be prepared by a licensed professional civil engineer registered in the State of Utah and must meet the full requirements of this Manual. Many of these requirements may be fulfilled by completing the required Long-Term Storm Water Management (LTSWM) Plan which can be found in Appendix B.

1. Drawing Requirements

- a. Scale (1" = 200'), north arrow, legend, title block showing project name, date, preparer's name, seal, and signature.

2. Development and Site Information

- a. Contact Information
 - i. Name, address, and telephone number of all persons having a legal interest in the property.
- b. Parcel Information
 - i. Tax reference number and parcel number of the property or properties affected.
 - ii. General description of the development, including location (township, range, section, subdivision, and lot).
- c. Site Geographical Details
 - i. Existing and proposed topographic base map (2-foot maximum contour interval) of the site which extends a minimum of 300 feet beyond the limits of the proposed development. Additional spacing may be required if offsite drainage is routed through the development.
 - ii. Property lines for site under consideration as well as all adjacent properties and city Right-of-Way.
 - iii. Existing Site Characteristics and Proposed Changes
 1. Existing and proposed land use including all existing structures, utilities, roads, parking areas, easements, and any other significant natural and manmade features.
 2. Existing and proposed manmade storm water management facilities (e.g., culverts, ditches, canals, inlets, manholes, cleanouts, basins, etc.) and any natural surface water facilities (e.g., streams, rivers, ponds, lakes, washes, swales, springs, wetlands, etc.). FEMA floodplain and floodways must be shown.
 3. Existing and proposed natural resources on site and surrounding area including ground cover and other native vegetative. Particular attention should be paid to environmentally sensitive features (e.g., soil contamination, drinking water source protection areas, etc.) that may provide opportunities or constraints for development.
 4. Existing and proposed tabulation of the percentage of surface area to be adapted to various uses. Surface area and percentage of pervious and impervious surfaces of the site both prior to development as well as after development. The percentage of increase of impervious surface will be required.

5. Limits of clearing and grading as well as surface area expected to be disturbed in construction.
 6. Required setbacks for structures from the center line of streams and washes, if applicable.
 - iv. A written description of the site plan and justification of proposed changes in natural conditions may also be required.
 - d. Subsurface Investigation
 - i. Groundwater depth, details of how it was determined and time of year it was measured.
 1. Maximum expected groundwater depth if different than above. Estimate of minimum depth to groundwater level on the site.
 - ii. Soils report indicating soil type(s) at appropriate locations and depths specific to the proposed storm water management facilities and how the soils were determined
 1. Infiltration Rates at appropriate locations and depths (e.g. bottom elevation of storm water management facilities intended for retention and/or infiltration) and how it was determined.
 2. Time (hours) of infiltration for corresponding design storm shall be indicated.
 - e. Storm Drain Master Plan Conformance
 - i. The final plan must include how the development and proposed improvements conform to the City Storm Drain Master Plan.
3. Hydrologic Information
 - a. Hydrologic runoff calculations for the pre-development and post-development conditions for the design storms specified in this Manual. Such calculations shall include:
 - i. Description of the design storm frequency, intensity, and duration
 - ii. Time of concentration
 - iii. Soil curve numbers or runoff coefficients
 - iv. Peak runoff rates and total runoff volumes for each watershed area
 - v. Documentation of sources for all computation methods
 - b. Runoff calculations in accordance with [Section 3.3](#) of this Manual. Include final runoff (cfs), coefficient of runoff, time of concentration, average rainfall intensity, and drainage area.
 - i. Normal historic (pre-development) flow data as available
 - c. Sufficient engineering analysis to show that the proposed storm water management measures are capable of controlling runoff from the site in compliance with the standards in this Manual.
 - d. Description of compliance with applicable flood control requirements and FEMA requirements, if necessary.
4. Hydrologic Information
 - a. General description of off-site drainage features and characteristics upstream and downstream of the site and any known drainage problems which affect or can affect the site.
 - b. Site outfall(s) or locations where storm water exits the property into adjacent properties or the MS4 shall be clearly identified and labeled on the plans.
 - c. Description of downstream receiving facilities for storm water discharges and the capacities of those facilities. Include calculations.
 - d. Design calculations to support inlet spacing and sizing of facilities. Include a description of drainage facility design computations.

- e. Storm frequency details (intensity and resource citation) utilized for all storm water facilities on site.
 - f. Storm Culvert Information
 - i. Size, material, and strength/pressure classifications.
 - ii. Invert elevations, slope, minimum and maximum depth of cover.
 - iii. Culvert capacities
 - iv. Flow velocity data on the increase in rate and volume of runoff for the design storms referenced,
 - v. Dimensions indicating both horizontal and vertical distances from all storm water management facilities to other utilities and structures on site.
 - g. Storm Water Management Facility Information
 - i. Plan and profile details specifying dimensions, sizing, invert elevation(s), slopes (side and bottom slope as required), volume calculations, design storm water surface elevation, and specifications of any appurtenances for all:
 - 1. Storm water junction structures (e.g., manholes, catch basins, vaults, etc.)
 - 2. Storm water storage facilities (e.g., detention/retention ponds, sumps, etc.)
 - 3. Storm water treatment facilities (e.g., LID BMPs, MTDs, etc.)
 - ii. Outlet control structures (e.g., orifices, etc.) shall be clearly labeled and shall include invert elevation and dimensions.
 - h. Location and details of emergency overflow structures.
 - i. Site Drainage Characteristics
 - i. Existing and proposed site surface elevation and slopes.
 - ii. Storm water flow patterns and paths.
 - 1. All flow directions shall be indicated with arrows.
 - 2. Velocity in all storm conveyance systems during design storm shall be provided for both on site and in adjacent properties.
5. Water Quality Information
- a. A Storm Water Quality Report is required for all sites. The Storm Water Quality Report Template can be found within the Utah LID Guide. For convenience, the Template has also been attached to this Manual in Appendix #.
 - b. If water quality requirements do not apply to the site, a description indicating why will be required.
 - c. 80th percentile Water Quality Volume (WQV) and calculations
 - d. Design decisions (e.g., marked up Utah LID Guide flow chart, or other considerations) indicating how a LID BMP is selected
 - i. OR Rationale as to why an LID BMP is infeasible
 - e. Design details which meet the requirements of 4.5 above shall be required for all proposed LID BMP(s) and/or MTD(s).
 - f. Submittals on treatment effectiveness which meets requirements of Section 3.5.2.
6. Landscaping and Site Stabilization Plan
- a. Landscaping and irrigation plan prepared by a registered landscape architect or by the soil conservation district. At a minimum, the plan must indicate type, sizing, and locations of all vegetation to be included as well as irrigation system details.

- b. Erosion and sediment control plan for all construction activities related to implementing any temporary and long-term storm water management practices on-site.
7. Operation, Monitoring, and Maintenance Standards
 - a. A Maintenance Agreement in accordance with Section 3.7.1. This covenant shall include:
 - i. Accessibility details in accordance with Section 3.7.1.1.
 1. Location and sizing of all storm water facility access points. Include description and sizing (dimensions, weight, etc.) of equipment required to maintain facility and indicate location and sizing of access which is sufficient for equipment sizing.
 2. Location and sizing of maintenance easement(s) in accordance with Section 3.7.1.1.1.
 - ii. Maintenance SOP in accordance with Section 3.7.1.2.
 - iii. Inspection SOP in accordance with Section 3.7.1.3.
8. Proof of Permit and Compliance

The applicant shall ensure that all other applicable State, Federal, County or other applicable permits have been acquired for the site prior to approval of the final storm water design plan. This may include, but is not limited to Injection well permit(s), industrial storm water permit(s), Construction General Permit, Common plan of Development permit, etc. Proof of applicable permits and compliance with said permits shall be required.

5.1.3 Engineering Design Checklist

To ensure that the full requirements of this Manual are met, Ogden City has developed an engineering design checklist which includes a section specific to storm water requirements and a checklist item for each minimum requirement outlined in this Manual. This engineering design checklist can be obtained through Ogden City Engineering Division and shall be completed and submitted to the City for review and final approval.

5.2 Post-Construction Submittal Requirements

5.2.1 Certificate of Compliance and Record Drawings

After construction and prior to release of the project escrow and closure of applicable permits, the following submittals will be required:

- **Certificate of Compliance:** A professional civil engineer licensed in the State of Utah shall perform a site inspection and provide a stamped Certificate of Compliance to the City to verify that all storm water management facilities were installed as designed. This inspection and certification shall be at the cost of the developer.
- **As Built Plans or Record Drawings:** As-Built Plans or Record Drawings will be required for all developments within Ogden City.

5.2.1.1 Reporting Requirements Post Construction

In accordance with the LTSWM Agreement, annual certification shall be submitted to the City by June 30th of each year to verify that adequate maintenance has been performed and the storm water management facility is functioning as designed.

6 Acronyms and Definitions

Term (Acronym)	Complete Definition
100-Year Frequency Storm	A storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in 100 years. It may also be expressed as an exceedance probability with a one percent chance of being equaled or exceeded in any given year.
10-Year Frequency Storm	A storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in ten years. It may also be expressed as an exceedance probability with a ten percent chance of being equaled or exceeded in any given year.
25-Year Frequency Storm	A storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in twenty-five years. It may also be expressed as an exceedance probability with a four percent chance of being equaled or exceeded in any given year.
2-Year Frequency Storm	A storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in two years. It may also be expressed as an exceedance probability with a 50 percent chance of being equaled or exceeded in any given year.
Adverse Impact	A significant negative impact to land, water and associated resources resulting from a Land Disturbing Activity. The negative impact includes increased Sedimentation, reduced groundwater recharge, negative impacts on aquatic organisms, negative impacts on wildlife and other resources and threat to public health through degradation of Water Quality
Applicant	A person who executes the necessary forms to obtain approval for a Land Disturbing Activity, as defined below.
Appropriate Plan Approval Agency	Refers to Ogden City. The City is responsible for review and approval of Storm water Management and Sediment Control Plans, issuing permits for land disturbing activities and conducting inspections and enforcement actions.
As-Built Plans or Record Documents	A set of engineering or site drawings that delineate the specific permitted infrastructure as constructed. Plans must be completed using a CAD system and resubmitted to the City for final acceptance.
Average Rainfall Intensity	Rainfall intensity shall be obtained from the National Weather Service's Precipitation Frequency Data Server (http://hdsc.nws.noaa.gov/hdsc/pfds/sa/ut_pfds.html).
Best Management Practice (BMP)	Structural, vegetative, or managerial controls used to treat, prevent, or reduce pollution in storm water runoff. Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the state. BMPs also include treatment requirements, operating procedures, and practices to control facility site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.
Clean Water Act (CWA)	The principle law governing pollution control and water quality of the Nation's waterways.

Term (Acronym)	Complete Definition
Common Plan of Development or Sale	One plan for development or sale, separate parts of which are related by any announcement, piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, plan, blueprint, contract, Permit application, zoning request, computer design, etc.), physical demarcation (including contracts) that identify the scope of the project. A plan may still be a common plan of development or sale even if it is taking place in separate stages or phases, is planned in combination with other construction activities, or is implemented by different owners or operators.
Common Plan Permit (CPP)	Refers to the UPDES General Storm Water Permit for Construction Activity Connected with Single Lot Housing Projects (Permit No. UTRH000000).
Construction Activity	Earth-disturbing activities such as land clearing and grubbing, grading, excavating and demolition.
Construction General Permit (CGP)	Refers to the UPDES General Permit for Storm Water Discharges from Construction Activities. This permit is required for all MS4 applicable projects.
Control Measure	Any BMP or other method used to prevent or reduce the discharge of pollutants to waters of the state.
Department Of Environmental Quality (DEQ)	State agency responsible for maintaining clean air, water, and land.
Detention Facility	A permanent storm water structure whose primary purpose is to temporarily store storm water runoff and release the stored runoff at controlled rates.
Developer	A person undertaking, or for whose benefit, activities covered by these regulations are commenced and/or carried out.
Division Of Water Quality (DWQ)	A division of DEQ that handles storm water and other water quality regulations and concerns.
Discharge Point	A point or location where surface or storm water runoff is concentrated before being released from the property.
Drainage Area	Any area contributing runoff to a single point. Consists of the entire catchment area which contributes surface and storm water runoff to a specific point.
Easement	A nonpossessory right to use and/or enter onto the real property of another without possessing it.
Emergency Overflow	A waterway in or about a hydraulic structure which allows the release of excess water.
Environmental Protection Agency (EPA)	United States federal government whose mission is to protect human and environmental health
Erosion	The gradual destruction or diminution or wearing away of land surface by the action of wind, water, gravity, ice or any combination of those items.
Erosion and Sediment Control	Practices which are designed to prevent or minimize loss of eroded soil at a site or control the unwanted movement of soil.
Exemption	Those land disturbing activities that are not subject to the Sediment and Storm water requirements contained within this Manual.

Term (Acronym)	Complete Definition
Federal Clean Water Act (CWA)	Establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.
Freeboard	The distance from the top of a bank or embankment to the high-water elevation during a design storm.
General Permit	Permit which covers multiple dischargers of a point source category within a designated geographical area, in lieu of individual Permits being issued to each discharger.
Grading	The excavating, filling stockpiling of earth material, or any combination thereof, including the land in its excavated or filled condition.
Groundwater	Water in a saturated zone or stratum beneath the surface of the land or below a surface water body or concentrated water beneath the earth's surface.
Hazardous Materials	Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.
Infiltration	The absorption of water into the soil, typically in the vertical direction.
Injection Well	A bored, drilled, or driven shaft whose depth is greater than the largest surface dimension; or, a dug hole whose depth is greater than the largest surface dimension; or, an improved sinkhole; or, a subsurface fluid distribution system. This definition also includes "sump".
Land Disturbing Activity	Any use of the land by any person that results in a change in the natural cover or topography that may cause Erosion and contribute to Sediment and alter the quality and quantity of storm water runoff. Such activities include, but are not limited to: clearing, removal of vegetation that disturbs the soil, stripping, grading, grubbing, excavating, filling, logging and storing of materials. Clearing of areas where soils are not exposed and an adequate vegetative structure is left in place is not considered land disturbance, provided that the clearing is not in anticipation of other construction activities such as grubbing and grading.
Limit of Analysis	Establish how far downstream the designer must verify the adequacy of the storm water conveyance system
Localized Flooding	Smaller scale flooding that may occur outside of a storm water conveyance system, which may include high water, ponding, or standing water from storm water runoff, which is likely to cause property damage or unsafe conditions.

Term (Acronym)	Complete Definition
Low Impact Development (LID)	An approach to land development (or re-development) that works with nature to more closely mimic pre-development hydrologic functions. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat storm water as a resource rather than a waste product. There are many practices that have been used to adhere to these principles such as bio-retention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements.
Manufactured treatment device (MTD)	A structural alternative to treating water quality on a site. This approach to treatment can be used when space is limited. MTDs are designed to remove chemical contaminants and sediment from runoff through filtration, vortex separation, and/or other technologies.
Maximum Extent Practicable (MEP)	The highest level of effectiveness that can reasonably be achieved given current technology and circumstances.
MS4 Applicable Project or Construction Sites	Construction sites of any public, private, or municipal project with a land disturbance of greater than or equal to one acre including projects less than one acre that are part of a larger common plan of development or sale which collectively disturbs land greater than or equal to one acre.
MS4 Permit	Refers to the Utah Pollutant Discharge Elimination System (UPDES) General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (UPDES Permit Number UTR090000).
Multi-Sector General Permit (MSGP)	Refers to the UPDES Multi-Sector General Permit (MSGP) for Storm Water Discharges Associated with Industrial Activities (Permit No. UTR000000).
Municipal Separate Storm Sewer Systems (MS4)	A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by a state, city, town, county, district, association, or their public body that is designed or used for collecting or conveying storm water.
National Pollutant Discharge Elimination System (NPDES)	Federal permit program that addresses water pollution by regulating point sources that discharge pollutants to waters of the United States.
Natural Waterways	Waterways that are part of the natural topography. They usually maintain a continuous or seasonal flow and are characterized as being irregular in cross section with meandering course. Construction channels such as drainage ditches shall not be considered Natural Waterways.
New Jersey Corporation for Advanced Technology (NJCAT) Program	A technology verification program which performs a comprehensive evaluation of vendor specific performance claims.
Notice Of Intent (NOI)	The mechanism used to “register” for coverage under a General Permit.
Notice Of Termination (NOT)	Form used for terminating coverage under a permit. Filed by permitted construction sites once they have been stabilized.

Term (Acronym)	Complete Definition
Operation & Maintenance (O&M) Plan	A plan which defines all activities required to maintain the effectiveness and monitor the performance of any storm water management facility.
Operator	Is the person or entity responsible for the operation and maintenance of the property or facility on a property.
Outfall	Location(s) where storm water exits the facility or property, including outlet pipes, ditches, swales, and other structures that transport storm water.
Owner	The individual or company that has owners rights to the property such as a block of land or building.
Percolation	The slow movement of water through the pores in soil or permeable rock.
Person responsible for the Land Disturbing Activity	(1) The person who has or represents having financial or operational control over the Land Disturbing Activity; and (2) The landowner or person in possession or control of the land who directly or indirectly allowed the Land Disturbing Activity or has benefited from it.
Pollutant	Solid waste, sewage, garbage, sewage sludge, chemical wastes, biological materials, wrecked or discarded equipment, rock, sand, and industrial or municipal waste. Typical construction site Pollutants include Sediment, oil and grease, pesticides and fertilizers, Pollutants from construction wastes, and Pollutants from construction materials. Pollutant does not mean sewage from vessels or water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well is used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.
Post-Development or Post-Construction	The conditions which exist following the completion of the Land Disturbing Activity in terms of topography, vegetation, land use and volume or direction of the storm water runoff.
Pre-Development or Pre-Construction	The conditions which existed prior to the initiation of the Land Disturbing Activity in terms of topography, vegetation, land use and quality, rate, volume or direction of the historic flow or storm water runoff.
Redevelopment	Any land disturbance activity that alters the current use of the land but does not necessarily alter the Pre-Development runoff characteristics.
Retention Facility	A structure whose primary purpose is to store a given volume of storm water runoff. Release of the given volume is by Infiltration and/or evaporation.
Runoff	Water that travels across the land surface, or laterally through the ground near the land surface, and discharges to water bodies either directly or through a collection and conveyance system. Runoff includes storm water and water from other sources that travels across the land surface.
Sediment	Solid particulate matter, both mineral and organic, which has been or is being transported by water, air, etc.

Term (Acronym)	Complete Definition
Snout	A hood structure, typically made of plastic or fiberglass, designed to skim the water surface to prevent discharge of floatable debris and other pollutants within a catch basin, manhole, or other storm water structure. A snout is typically installed in storm water structures with a depressed area depth beneath the bottom of the pipe intended to capture of solids that will sink and settle out of the runoff.
Stabilization	The installation of vegetative and/or non-vegetative to establish a soil cover to prevent and/or reduce soil Erosion and Sediment loss.
Storm Drain Master Plan	A plan for the City Storm Drain system which analyzed the impact of existing and future land uses and land disturbing activities in the City.
Storm Drain Systems	Publicly-owned facilities by which Storm water is collected and/or conveyed, including but not limited to any roads with drainage systems, streets, gutters, curbs, inlets, storm drains, facilities, natural and human-made or altered drainage channels, reservoirs, and other drainage infrastructure.
Storm Water	Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation and resulting from such precipitation.
Storm Water Control Measure	A structural or non-structural action taken to control the rate, volume, and/or pollution of storm water, including storm water management facilities, good housekeeping practices, and pollution prevention activities.
Storm Water Conveyance	A pipe, ditch, or swale that is designed to carry storm water; a storm water conveyance may also be referred to as a storm drain or storm sewer.
Storm Water General Permit for Construction Activities (CGP)	General permit to continue the streamlined permit coverage of typical construction activity for storm water discharges throughout the State of Utah, except for within Indian country, of which in those areas the EPA is the permitting authority.
Storm Water Hotspots	Storm water hotspot means an area where land use or pollution generating activities have the potential to generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water runoff.
Storm Water Management	(1) Quantitative control, a system of vegetative or structural measures, or both, that control the increased volume and rate of storm water runoff caused by manmade changes to the land. (2) Qualitative control, a system of vegetative, structural or other measures that reduce or eliminate Pollutants that may otherwise be carried by storm water runoff.
Storm Water Management and Sediment Control Plan	A set of drawings, other documents and supporting calculations submitted by a person as a prerequisite to obtain a permit to undertake a Land Disturbing Activity, which contains all of the information and specifications required by the City.
Storm Water Management Design	Design process used to control the storm water runoff that comes primarily from impervious surfaces like parking lots, driveways, and rooftops.

Term (Acronym)	Complete Definition
Storm Water Management Facility	any inlet, catch basin, catch basin manhole combination, maintenance access hole, manhole, drainage pipe, sewer, channel, ditch, culvert, tank, outlet, pond, depression or body of water created to divert, or collect or used to manage storm water quantity or treat storm water quality on public or private property. This definition also includes “storm water facility”.
Storm Water Management Program (SWMP)	A document developed by the City to comply with the NPDES Storm water Permit. The SWMP serves as the basis for implementing and administering the City’s Storm water Management program. The SWMP outlines the minimum control measures and associated Best Management Practices (BMPs) to be used in controlling Storm water discharges to the Storm Drain System
Storm Water Pollution Prevention Plan (SWPPP)	A site-specific plan that identifies all of the activities and conditions at the site that could cause water pollution and details the steps the facility will take to prevent the discharge of any unpermitted pollutants.
Storm Water Runoff	Direct response of a watershed to precipitation and includes the surface and subsurface runoff that enters a ditch, stream, storm sewer or other concentrated flow during and following the precipitation.
Sump	A bored, drilled, or driven shaft whose depth is greater than the largest surface dimension; or, a dug hole whose depth is greater than the largest surface dimension; or, an improved sinkhole; or, a subsurface fluid distribution system. This definition also includes “injection well”.
Swale	A measure which could include a lining of grass, riprap or other materials which can function as a Detention Structure and convey storm water runoff while protection the structure from erosion.
Underground Injection Control Program (UIC)	A program to protect underground sources of drinking water (USDW) from endangerment by subsurface emplacement of fluids (40 CFR Parts 144-148) into UIC wells.
Unified Soil Classification System (USCS)	A soil classification system used in engineering and geology to describe the texture and grain size of a soil
United State Environmental Protection Agency (EPA)	The federal agency responsible for environmental matters.
Utah Pollutant Discharge Elimination System (UPDES)	Utah permit program used to control the discharge of p[pollutants to waters of the State. Includes storm water permits. This is Utah’s version of NPDES.
Utah Storm Water Advisory Committee (USWAC)	A subcommittee of the American Public Works Association (APWA) Utah Chapter that is open to anyone to attend.
Variance	The modification of the minimum Sediment and Storm water Management requirements for specific circumstances where strict adherence of the requirements would result in unnecessary hardship and not fulfill the intent of the requirements. All variances must be approved by the City.

Term (Acronym)	Complete Definition
WA DOE Technology Acceptance Protocol – Ecology (TAPE)	Storm water treatment technologies which are reviewed and certified by the Washington state Technology Assessment Protocol.
Waiver	The relinquishment from Sediment and Storm water Management requirements granted by the City for a specifics Land Disturbing Activity. Waivers are granted on a case-by-case review.
Water Quality	Those characteristics of storm water runoff from a Land Disturbing Activity that relate to the physical, chemical, biological, or other related item for the integrity of water.
Water Quality Flow (WQF)	The design flow required for an MTD installed within Ogden. This flow can be calculated using the Rational Method and a 1-year 3-hour design storm.
Water Quality Volume (WQV)	The volume of runoff generated within a BMP's drainage area over a 24-hour period during the 80th percentile storm event.
Water Quantity	Those characteristics of storm water runoff that relates to the rate and volume of the storm water runoff to downstream areas resulting from land disturbing activities.
Waters of the State	All streams, lakes, ponds, marshes, water-courses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private which are contained within, flow through, or border upon this state or any portion thereof, except bodies of water confined to and retained within the limits of private property, and which do not develop into or constitute a nuisance, or a public health hazard, or a menace to fish and wildlife which shall not be considered to be "waters of the state".
Watershed	The Drainage Area contributing storm water runoff to a single point.
Waterwise Landscape	The use of plants that have lower supplemental water needs and are adapted to the climate and available water conditions of the region. The term can also include drought resistant plants and plants that are native to arid conditions and temperature conditions of the region.

7 References

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APPENDIX A: Executive Summary of Minimum Design or Submittal Requirements

This Appendix outlines some minimum design or submittal requirements identified within this Manual. The tables in this Appendix may not be a full representation of Ogden City's storm water design requirements and therefore should be used in conjunction with the SWDM, Ogden City Engineering Standards, and Municipal Codes.

Table A1: Summary of Minimum Requirements, All Storm Water Facilities on All Projects

Design Element	SWDM Section	Minimum Requirement
All Storm Water Facilities	3.2.1.1	* Identify depth of groundwater & maximum expected groundwater depth.
	3.2.2	* Describe intended site use as well as pollutants known to be discharged or that have the potential to be discharged based on site use.
	3.2.2	* State if site is identified as high-use, high-sensitivity, or high pollutant potential.
	3.3	* Submit Rational Method (Equation 1) calculations for storm water runoff before & after construction.
	3.3.1.1	* State post-construction runoff (must be \leq pre-development flow or 0.1 cfs per acre in lieu of pre-development flow).
	3.3.1.2	* State rational method runoff coefficient(s) used (see Table 2).
	3.3.1.3	* Identify Time of Concentration used (per SCS TR55, minimum is 10 minutes).
	3.4	Storm water that falls on site shall not drain directly into any canal, irrigation ditch, or subdrain system.
	3.4.6	City must be consulted if area currently experiences localized flooding.
	3.5.1.1	Sites requiring coverage under UTRC00000 (CGP), UTRH00000 (CPP) or, UTR000000 (MSGP) UPDES permits must incorporate water quality standards.
	3.5.1.2	Sites identified as high-use, high-sensitivity, or high-pollutant-potential must incorporate water quality standards.
	3.5.3.1	All sites not utilizing a landscaped area to route storm water prior to discharge must incorporate treatment for oil & sand. Snouts are not acceptable solution for oil & sand separation.
	3.7	* Landscape & irrigation plan identifying selection of appropriate plant materials, irrigation system design, & other related items (Must be landscaped in accordance with standards & municipal codes).
	3.7.1	* Submit completed and recorded LTSWM Agreement & LTSWM Plan per Appendix B.
	3.7.1.1	Shall be equipped with suitable access for inspection, maintenance, and/or repair.
	5.1.2	* Submit completed & signed Engineering Design Checklist.
	5.1.2	* Post-Construction, submit Certificate of Compliance to verify that storm water management facilities were installed as designed.
	5.1.2	* Post-Construction, submit As-Built Plans or Record Drawings.
	5.2.1.1	* Post-Construction, submit annual certification to verify adequate maintenance has been performed & facility is functioning as designed.

* Indicates design submittal requirement.

Table A2: Summary of Minimum Requirements, Conveyances and Roadways

Design Element	SWDM Section	Minimum Requirement
Conveyance	3.4.1 (3.4.1.3.2)	Shall be designed to convey the 10-yr 24-hr storm (without causing erosion).
	3.4.1.1	* Identify all pipe sizes (pipe size shall be determined by reqd. capacity but not < 15" diameter in City Right-of-Way).
	3.4.1.1	* Identify all pipe materials (storm water pipe material in City Right-of-Way shall be RCP).
	3.4.1.1	* Identify pipe strength class (RCP strength class per Table 3, Class III or greater)
	3.4.1.2	* State vertical clearance between other utilities (minimum is 18")
	3.4.1.2	* State minimum cover depth for all pipe (minimum cover for RCP is 2')
	3.4.1.3	* State peak velocities for all new conveyances, existing conveyances impacted by development, & all site outfalls (maximum permissible pipe velocity is 20 ft/sec).
	3.4.1.3.1	* State slope for all pipes (grades shall provide minimum velocity of 3 ft/sec at full flow or 2 ft/sec at design flow, whichever requires greater slope. Minimum pipe slopes for full flow per Table 4)
	3.4.1.3.2	* If reqd., provide energy dissipation design (reqd. for any flow velocities ≥ 9 ft/sec or if at changes in flow directions $\geq 45^\circ$).
	3.4.1.3.2	Velocities shall also be designed to be non-erosive at the re-entry into the natural stream or downstream channel.
	3.4.1.3.2	* If reqd., provide erosion protection design at receiving channel or stream (reqd. when outlet velocity is ≥ 6 ft/sec or erosion is expected).
	3.4.1.3.2.1	* Provide assessment & verify adequacy of downstream storm water conveyance system to the limit of analysis.
	3.4.2	A manhole is reqd. at all changes in pipe size, slope, or alignment or at a junction with other storm drain lines.
	3.4.2	* Identify distance between all adjacent manholes (maximum spacing of 400').
	3.4.2	Drop manholes are not permitted.
	3.4.2	* Identify diameter of all manholes (Manholes in the Right-of-Way shall be a minimum of 5' diameter).
	3.4.4	* Identify sizing of all inlets (capacity of inlets must be calculated by an engineer).
	3.4.4	* Identify distance between inlets (Inlet spacing shall be designed to collect a 10-yr 24-hr storm. Maximum spacing between inlets is 350')
	3.4.4	Inlet boxes must be located outside of any point of curvature, drive approach, intersection, pedestrian ramp, or other location which may result in unsafe driving conditions or excess pollutant/traffic loading.
Roadways	3.4.5	Roads must provide adequate drainage for a 100-yr 24-hr flood discharge in the street Right-of-Way.
	3.4.5	*Identify flow depth of design storm (depth of flow shall not exceed the existing curb height).
	3.4.5	Minimum design frequency & spread per Table 5.
	3.4.5	Downhill cul-de-sacs & dead ends are not permitted unless approved by City Engineer

* Indicates design submittal requirement.

Table A3: Summary of Minimum Requirements, Storm Water Storage Facilities

Design Element	SWDM Section	Minimum Requirement
All	3.2.1	* Provide a subsurface investigation & geotechnical evaluation
	3.4	All storm water that falls on site must be routed through a storage facility.
	3.4.3	* Identify emergency overflow path (must convey to acceptable location, minimum freeboard is 1').
	3.4.3	Standing water is not permitted to rise above 8" in parking areas.
	3.4.3	Use of pumps in storm water facilities is not permitted.
	3.4.3	* Submit volume calculations (reduction based on evaporation or infiltration not allowed).
	3.4.3	* Identify distance of from facility edge to nearby public utilities (minimum is 5')
Regional	3.4.3.1	Not permitted unless approved by City Engineer.
	3.4.3.1	Shall be located on separate parcel which in compliance with Ogden City Zoning Ordinances or in an Ogden City easement.
	3.4.3.1	* If reqd., include a "low flow" channel designed for 2-yr 24-hr storm (reqd. for detention facilities).
	3.7.1.1	* Identify maintenance access path (10-ft lane width around basin reqd.).
	3.7.1.1	* Identify slope of access into the basin (maximum slope of 10H:1V).
	3.7.1.1	* Provide detail showing access pavement design (20-ton, heavy truck access constructed of asphalt or concrete over road base into basin & to all inlet & outlet structures reqd.).
Above Ground	3.4.3.2	* Identify side slopes (maximum side slope is 3H:1V).
	3.4.3.2	* Submit design details of forebay (a forebay or place for debris & other polluted elements to settle out upstream is reqd.).
Under Ground	3.4.3.3	* Submit design details of pretreatment system (a pretreatment system with offline pollutant storage to capture sediment debris, & other particulates prior to all inlets into the underground system is reqd.).
	3.4.3.3	* If reqd., submit manufacturer's specs & void specs for aggregate (reqd. if gravel void space is counted toward storage volume).
	3.4.3.3	System must be accessible through outside entry means.
Infiltration-Dependent (Retention)	3.2.1.1	* Identify bottom elevation of pond (minimum distance from bottom elevation to the highest anticipated groundwater depth is 2').
	3.2.1.2.1	Must have native soil below basin.
	3.2.1.2.1	* Submit soils report with hydrologic soil group & infiltration rate (Table 1).
	3.2.1.2.1	* If reqd., submit in-situ soils tests & infiltration rate (per ASTM & D3385) ASTM D5856 (reqd. when owner does not accept Table 1 values or retention volume is claimed to be infeasible based on values in Table 1)
	3.4.3.5	Retention facilities shall be sized to retain volume of 100-yr 24-hr storm.
	3.4.3.5	Sumps (injection wells) not permitted unless approved by City Engineer.
	3.4.3.5	Sumps shall be sized to retain volume of a 100-yr 24-hr storm.
	3.4.3.5	* Identify infiltration time based on design storm (Maximum water infiltration time for a retention facility is 72 hrs. Maximum water infiltration time for a sump is 24 hrs.)
Detention	3.4.3.4	Shall be sized to detain volume of a 25-yr storm & include a metered outflow.
	3.4.3.4	* Identify size of orifice (minimum discharge orifice diameter is 3").
	3.4.3.4	* Identify minimum slope (minimum slope across any portion is 1%).

* Indicates design submittal requirement.

Table A4: Summary of Minimum Requirements, Sites Requiring Water Quality Standards

Design Element	SWDM Section	Minimum Requirement
Water Quality	3.5.2	* Submit engineering documents or an engineered plan showing design, calculations and/or testing to show the effectiveness of the treatment.
	3.5.2.1	Must route all storm water which falls on the site through an approved LID BMP (Table 8) and/or an MTD.
	3.5.2.1	Must retain 80 th Percentile Water Quality Volume (WQV) on site.
	3.5.2.1.1	* Provide description of design decisions made by a licensed professional regarding LID BMPs.
	3.5.2.1.2	* Submit design details of LID BMPs (approved LID BMPs per Table 8).
	3.5.3.1	* State if site is identified as high-use, high-sensitivity, or high-pollutant-potential (If identified, must install a MTD in addition to & upstream of LID BMPs).
	3.5.3.1.1	MTDs shall be sized & designed to remove 50% of total suspended solids (TSS) with a median particle size of 75 microns.
	3.5.3.1.1	* Submit NJDEP certification for MTD(s).
	3.5.3.1.1	* Submit sizing calculations for MTD(s) (MDTs shall be sized to treat the prescribed Water Quality Flow rate (WQF)).
	3.5.4.1.1	New developments must treat WQV of runoff generated in the full limits of disturbance.
	3.5.4.1.2	Redevelopment projects which increase impervious surface by > 10% must treat the net increase in volume.
	3.5.4.2	* Submit Water Quality Volume (Equation 2) calculations.
	3.5.4.2.1	* Identify 80 th Percentile Precipitation Depth (west of Harrison Blvd is 0.48", east is 0.62").
	3.5.4.2.2	* Submit water quality volumetric coefficient calculations (Equation 3, 4 or 5 depending on site's hydrologic soil group).
Sites Claiming LID Infeasibility	3.5.3	* Submit rationale for the use of & design details of alternative water quality design criteria.
	3.5.3	* Submit calculations quantifying that LID has been used to the maximum extent feasible.
	3.5.3	* Submit documentation stating justification of infeasibility.
	3.5.3.1	An MTD is reqd. prior to storm water discharge.

* Indicates design submittal requirement.

APPENDIX B: Long-Term Storm Water Management (LTSWM)

As stated in [Section 3.7.1](#) of this Manual, all storm water management facilities shall require a LTSWM Agreement and Plan to ensure the system is maintained to function as designed post-construction. This Appendix includes the LTSWM Agreement as well as the LTSWM Plan template to be utilized to fulfil this requirement.

When recorded, mail to:

Ogden City Recorder
2549 Washington Blvd, Suite 210
Ogden, UT 84401

Affects Parcel No(s): _____

LONG-TERM STORMWATER MANAGEMENT AGREEMENT

This Long-Term Stormwater Management Agreement ("Agreement") is made and entered into this _____ day of _____, 20_____, by and between Ogden City, a Utah municipal corporation ("City"), and

_____,
a _____ ("Owner").

RECITALS

WHEREAS, the City is authorized and required to regulate and control the disposition of storm and surface waters within the Municipal Separate Storm Sewer System ("MS4"), as set forth in the City's Municipal Ordinances, including Title 9 of that code ("Ordinance"), adopted pursuant to the Utah Water Quality Act, as set forth in *Utah Code Ann.* §§ 19-5-101, *et seq.*, as amended ("Act"); and

WHEREAS, the Owner hereby represents and acknowledges that it is the owner in fee simple of certain real property more particularly described in Exhibit "A," attached hereto and incorporated herein by this reference ("Property"); and

WHEREAS, the Owner desires to build or develop the Property and/or to conduct certain regulated construction activities on the Property which will alter existing storm and surface water conditions on the Property and/or adjacent lands; and

WHEREAS, in order to accommodate and regulate these anticipated changes in existing storm and surface water flow conditions, the Owner is required to build and maintain at Owner's expense a storm and surface water management facility or improvements ("Stormwater Facilities"); and

WHEREAS, the Stormwater Facilities are more particularly described and shown in the final site plan or subdivision approved for the Property and related engineering drawings, and any amendments thereto, which plans and drawings are on file with the City and are hereby incorporated herein by this reference ("Development Plan"); and

WHEREAS, summary description of all Stormwater Facilities, details and all appurtenance draining to and affecting the Stormwater Facilities and establishing the standard operation and routine maintenance procedures for the Stormwater Facilities, and control measures installed on the Property, ("Long Term Stormwater Management Plan") more particularly shown in Exhibit "B" on file with the City Recorder and,

WHEREAS, a condition of Development Plan approval, and as required as part of the City's Small MS4 UPDES General Permit from the State of Utah, Owner is required to enter into this Agreement establishing a means of documenting the execution of the Long Term Stormwater Management Plan and,

NOW, THEREFORE, in consideration of the benefits received and to be received by the Owner, its successors and assigns, as a result of the City's approval of the Long Term Stormwater Management Plan, and the mutual covenants contained herein, the parties agree as follows:

Section 1

Construction of Stormwater Facilities. The Owner shall, at its sole cost and expense, construct the Stormwater Facilities in accordance with the Development Plans and specifications, and any amendments thereto which have been approved by the City.

Section 2

Maintenance of Stormwater Facilities. The Owner shall, at its sole cost and expense, adequately maintain the Stormwater Facilities. Owner's maintenance obligations shall include all system and appurtenance built to convey stormwater, as well as all structures, improvements, and vegetation provided to control the quantity and quality of the stormwater. Adequate maintenance, for purposes of this Agreement, is defined as good working condition so that the Stormwater Facilities are performing their design functions. The Owner shall, at its sole cost and expense, perform all work necessary to keep the Stormwater Facilities in good working condition, free of any debris, trash, or other materials that may damage, plug, or block the transmission of stormwater through the Stormwater Facilities.

Section 3

Annual Maintenance Report of Stormwater Facilities. The Owner shall, at its sole cost and expense, inspect the Stormwater Facilities and submit an inspection report and certification to Ogden City Engineering annually. The purpose of the inspection and certification is to assure safe and proper functioning of the Stormwater Facilities. The annual inspection shall cover all aspects of the Stormwater Facilities, including, but not limited to, the parking lots, structural improvements, berms, channels, outlet structure, pond areas, access roads, vegetation, landscaping, etc. Deficiencies shall be noted in the inspection report. The report shall also contain a certification as to whether adequate maintenance has been performed and whether the structural controls are operating as designed to protect water quality. The annual inspection report and

certification shall be due by June 30th of each year and shall be on forms acceptable to the City.

Section 4

City Oversight Inspection Authority. The Owner hereby grants permission to the City, its authorized agents and employees, to enter upon the Property and to inspect the Stormwater Facilities upon reasonable notice not less than three (3) business days to the Owner. Such inspections shall be conducted in a reasonable manner and at reasonable times, as determined appropriate by the City. The purpose of the inspection shall be to determine and ensure that the Stormwater Facilities are being adequately maintained, are continuing to perform in an adequate manner, and are in compliance with the Act, the Ordinance, and the Stormwater Facilities Maintenance Plan.

Section 5

Notice of Deficiencies. If the City finds that the Stormwater Facilities contain any defects or are not being maintained adequately, the City shall send Owner written notice of the defects or deficiencies and provide Owner with a reasonable time, as set forth in the written notice, to cure such defects or deficiencies. Such notice shall be served personally to the Owner or sent via certified mail to the Owner at his/her last known mailing address as set forth in the Weber County records and to the Property.

Section 6

Owner to Make Repairs. The Owner shall, at its sole cost and expense, make such repairs, changes or modifications to the Stormwater Facilities as may be determined as reasonably necessary by the City within the required cure period to ensure that the Stormwater Facilities are adequately maintained and continue to operate as designed and approved.

Section 7

City's Corrective Action Authority. In the event the Owner fails to adequately maintain the Stormwater Facilities in good working condition acceptable to the City, after due notice of deficiencies as provided in Section 5 and failure to cure, then, upon Owner's failure to cure or correct within thirty (30) days following a second notice delivered to Owner, the City may issue a Citation punishable as a Misdemeanor in addition to any issued by the State of Utah or the Environmental Protection Agency. The City may also give written notice that the facility storm drain connection will be disconnected from the MS4. Any damage resulting from the disconnection is subject to the foregoing cure periods. It is expressly understood and agreed that the City is under no obligation to maintain or repair the Stormwater Facilities, and in no event shall this Agreement be construed to impose any such obligation on the City. The actions described in this Section are in addition to and not in lieu of any and all equitable remedies available to the City as provided by law for Owner's failure to remedy deficiencies or any other failure to perform under the terms and conditions of this Agreement.

Section 8

Reimbursement of Costs. In the event the City, pursuant to this Agreement, incurs any costs, or expends any funds resulting from enforcement or cost for labor, use of equipment, supplies, materials, and the like related to storm drain disconnection from the City system, the Owner shall reimburse the City upon demand, within thirty (30) days of receipt thereof for all actual costs incurred by the City. After said thirty (30) days, such amount shall be deemed delinquent and shall be subject to interest at the rate of ten percent (10%) per annum. Owner shall also be liable for any collection costs, including attorneys' fees and court costs, incurred by the City in collection of delinquent payments.

Section 9

Successor and Assigns. This Agreement shall be recorded in the Weber County Recorder's Office and the covenants and agreements contained herein shall run with the land and whenever the Property shall be held, sold, conveyed or otherwise transferred, it shall be subject to the covenants, stipulations, agreements and provisions of this Agreement which shall apply to, bind and be obligatory upon the Owner hereto, its successors and assigns, and shall bind all present and subsequent owners of the Property described herein.

Section 10

Severability Clause. The provisions of this Agreement shall be severable and if any phrase, clause, sentence or provision is declared unconstitutional, or the applicability thereof to the Owner, its successors and assigns, is held invalid, the remainder of this Agreement shall not be affected thereby.

Section 11

Utah Law and Venue. This Agreement shall be interpreted under the laws of the State of Utah. Any and all suits for any claims or for any and every breach or dispute arising out of this Agreement shall be maintained in the appropriate court of competent jurisdiction in Weber County, Utah.

Section 12

Indemnification. This Agreement imposes no liability of any kind whatsoever on the City, and the Owner agrees to hold the City, its elected officials, employees, and agents harmless from any liability in the event the Stormwater Facilities fail to operate properly. The Owner shall indemnify and hold the City harmless for any and all damages, accidents, casualties, occurrences, or claims which might arise or be asserted against the City from failure of Owner to comply with its obligations under this agreement relating to the Stormwater Facilities.

Section 13

Amendments. This Agreement shall not be modified except by written instrument executed by the City and the Owner of the Property at the time of modification, and no modification shall be effective until recorded in Weber County Recorder's Office.

Section 14

Subordination Requirement. If there is a lien, trust deed or other property interest recorded against the Property, the trustee, lien holder, etc., shall be required to execute a subordination agreement or other acceptable recorded document agreeing to subordinate their interest to this Agreement.

Section 15

Exhibit B. The Long-Term Stormwater Management Plan (LTSWMP) must adapt to change in good judgment when site conditions and operations change and when existing programs are ineffective. Exhibit B will not be recorded as part of this Agreement with the Weber County Recorder, but shall be included by reference and kept on file with the City Recorder. Revision applications must be filed with the City _____ and amended into the LTSWMP on file with the _____ City recorder.

LONG-TERM STORMWATER MANAGEMENT PLAN AGREEMENT

SO AGREED this _____ day of _____ 20_____.

PROPERTY OWNER

By: _____ Title: _____

By: _____ Title: _____

STATE OF UTAH)

:ss.

COUNTY OF)

The above instrument was acknowledged before me by _____, this _____ day
of _____, 20_____.

Notary Public
Residing in: _____
My commission expires: _____

OGDEN CITY

By: _____ Date: _____
City Engineer

Attest: _____
City Recorder

STATE OF UTAH)

:ss.

COUNTY OF)

The above instrument was acknowledged before me by Michael P. Caldwell, the Mayor of
Ogden City, this _____ day of _____, 20_____.

Notary Public
Residing in: _____
My commission expires: _____

Attachments:

Exhibit A: Legal Description

Exhibit B: Long-Term Stormwater Management Plan; Filed with Ogden City Recorder

CITY OF OGDEN

LONG-TERM STORM WATER MANAGEMENT (LTSWM) PLAN TEMPLATE

Prepared by:

Ogden City Engineering Division
2549 Washington Blvd, Ogden, Utah 84401
Phone: 801-629-8000
Website: www.ogdencity.com

Instructions

Ogden has developed this LTSWM Plan template to help you ensure that your LTSWM Plan addresses key elements required by Ogden City and the State of Utah Department of Environmental Quality (DEQ), Division of Water Quality (DWQ).

Supplemental Documents: This template is intended to be used in conjunction with the following documents available at the following links:

- [City of Ogden Storm Water Design Manual \(SWDM\)](#)
 - [Ogden City Long Term Storm Water Agreement](#)
- [DWQ's document "A Guide to Low Impact Development within Utah" \(LID Guide\)](#)

Using the LTSWM Plan Template: Blue text, □, and indicates special notes or sections which may need to be filled in by the user. This template includes instructions and space for project-specific information throughout. You should read any instructions provided before you complete the section. If you require additional clarification, refer to the Ogden City SWDM or the LID Guide (linked above). Instructions provided in specific section may give links to other resources that may be useful. Some sections of the template may require only a brief description or not apply to your project at all, while others may require several pages of explanation. However, all sections of the document should be filled out, unless otherwise instructed to leave blank. DO NOT DELETE ANY SECTIONS OF THIS DOCUMENT. Ogden City reserved the right to dismiss review and require resubmittal of incomplete LTSWM Plans.

This template was developed in Word so that you can easily add tables and additional text. If you have found this template as a PDF format, you can download the editable Word document by [clicking this link](#).

LTSWM Plan for:

Insert Project or Development Name
Insert Parcel Number
Insert Site Address
Insert City, State, Zip Code
Insert Project Site Telephone Number (if applicable)

LTSWM Plan Preparation Date:

__/__/__

Key Responsible Contacts:

Site Owner

Insert Company or Organization Name
Insert Address
Insert City, State, Zip Code
Insert Name
Insert Telephone Number
Insert Email

LTSWM Design Engineer:

Insert Company or Organization Name
Insert Address
Insert City, State, Zip Code
Insert Name
Insert Telephone Number
Insert Email

Site Operator or Manager:

Insert Company or Organization Name
Insert Address
Insert City, State, Zip Code
Insert Name
Insert Telephone Number
Insert Email

Insert Engineer Stamp Below
(signed and dated across the seal)

LTSWM Primary Contact:
(if different than above)

Insert Company or Organization Name
Insert Address
Insert City, State, Zip Code
Insert Name
Insert Telephone Number
Insert Email

If LTSWM Primary Contact is left blank, please specify who will oversee regular site operation, inspections, and annual reporting regarding the LTSWM for this property:

- ☐ **Site Owner**
☐ **Site Operator or Manager**

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SECTION 1: GENERAL SITE INFORMATION

1.1 Nature of Site Use

Section 1.1 must be filled out entirely for all projects.

1.1.1 Land Use

Indicate the type of land use. [Select one.](#)

<input type="checkbox"/>	Small-Scale Residential: Includes individual or single-family homes as well as multifamily properties that have ≤ 4 units.
<input type="checkbox"/>	Large-Scale Residential: Includes multi-family, townhome, or apartment buildings that have > 4 units.
<input type="checkbox"/>	Commercial: Any development and/or structure constructed mainly for the purpose of conducting business, including but not limited to retail stores, restaurants, shopping centers, business offices, gas stations, etc.
<input type="checkbox"/>	Industrial: Includes any development involving the use of premises (land and buildings) for manufacturing, processing, bulk storage, warehousing, servicing, and repair activities, etc. If site is industrial, Section 1.2 must be filled out.
<input type="checkbox"/>	Institutional: Any development and/or structure constructed for the operation of hospitals, schools, libraries, auditoriums, museums, and public/government offices. Industrial sites must fill out Section 1.2.
<input type="checkbox"/>	Mixed-Use: A type of development that blends multiple uses, such as residential, commercial, industrial, or institutional into one space, where the functions of the different uses are to some degree physically and functionally integrated. Mixed-Use sites with an industrial use must fill out Section 1.2.

If the site is large-scale residential, commercial, industrial, institutional, or mixed-use and intends to discharge storm water, Section 5 must be filled out.

1.1.2 Site Use Description

Describe the intended site use: [INSERT TEXT HERE](#)

1.1.3 Pollutants

List pollutants known to be discharge or that have potential to be discharged from the site based on the site use: [INSERT TEXT HERE](#)

1.1.4 High-Use, High-Sensitivity, or High Pollutant Potential Site Criteria:

Indicate if the site includes or meets any of the following criteria: [Select all that apply.](#)

<input type="checkbox"/>	Discharges directly into a jurisdictional wetland or local water body. See Section 1.3.4 for wetland info.
<input type="checkbox"/>	Expected average daily traffic counts exceeding 100 vehicles per 1,000 square feet of gross building area or any site with more than 6 parking stalls.
<input type="checkbox"/>	Petroleum storage or transfer areas (excluding delivered heating oil), including gas stations with underground storage tanks.
<input type="checkbox"/>	Road intersections with a measured average daily traffic of 25,000 vehicles or more on the main roadway and 15,000 or more on any intersecting roadways. Projects proposing primarily pedestrian or bicycle use improvements are excluded.
<input type="checkbox"/>	Includes agricultural pesticide, herbicide, and fertilizer storage, use, filling, and mixing areas, dairy farms, and animal feed lots with more than 10 animal units, farm operations and manure piles.
<input type="checkbox"/>	Airport maintenance and fueling sites.

<input type="checkbox"/>	Auto operations and fleet vehicle maintenance facilities (commercial), including dealership maintenance departments, tire shops, auto body stores, engine repair, rust proofing shops, oil and lube shops, vehicle rental with maintenance and car washes.
<input type="checkbox"/>	Boat building and refinishing.
<input type="checkbox"/>	Chemical reclamation facilities.
<input type="checkbox"/>	Chemigation wells.
<input type="checkbox"/>	Concrete, asphalt, and tar companies.
<input type="checkbox"/>	Dry cleaners, with onsite chemicals.
<input type="checkbox"/>	Embalming services.
<input type="checkbox"/>	Dump sites and recycling centers.
<input type="checkbox"/>	Maintenance garages.
<input type="checkbox"/>	Food processing, meat packing, and slaughterhouses.
<input type="checkbox"/>	Furniture stripping, painting, and finishing businesses.
<input type="checkbox"/>	Industrial manufacturers of: chemicals, pesticides, herbicides, paper products, leather products, textiles, rubber, plastic, fiberglass, silicone, glass, pharmaceuticals, and electrical equipment, etc.
<input type="checkbox"/>	Industrial waste disposal/impoundment areas.
<input type="checkbox"/>	Junk and salvage yards.
<input type="checkbox"/>	Landfills and transfer stations.
<input type="checkbox"/>	Machine shops, metal plating, heat treating, smelting, annealing, and descaling facilities.
<input type="checkbox"/>	Mining operations including radiological, sand and gravel excavation and processing.
<input type="checkbox"/>	Municipal wastewater treatment plants.
<input type="checkbox"/>	Railroad yards.
<input type="checkbox"/>	Residential pesticide, herbicide, and fertilizer storage, use, filling, and mixing areas.
<input type="checkbox"/>	RV waste disposal stations.
<input type="checkbox"/>	Salt and salt-sand piles.
<input type="checkbox"/>	Septic tank drain field systems.
<input type="checkbox"/>	Sumps or injection wells
<input type="checkbox"/>	Toxic chemical storage and oil pipelines.
<input type="checkbox"/>	Wood preservative treatment facilities.
<input type="checkbox"/>	Other reason identified by owner, design engineer or City Engineer: INSERT TEXT HERE
Sites which meet one or more of the criteria above are identified as high-use, high-sensitivity, or high pollutant potential and must complete Section 5.	
Is the site identified as high-use, high sensitivity, or high pollutant potential?	
<input type="checkbox"/> Yes	<input type="checkbox"/> No

1.2 Industrial Sites

Section 1.2 is required for industrial or mixed-use sites with an industrial use. If this does not apply, select "No" below and proceed to the next section.

Is this section applicable to the project under consideration?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
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1.2.1 Multi-Sector General Permit (MSGP) Requirements

<ul style="list-style-type: none"> Many industrial facilities are required to gain coverage under the MSGP for Storm Water Discharges Associated with Industrial Activities. (Permit No. UTR000000). To determine if your site requires MSGP coverage, visit: https://deq.utah.gov/water-quality/general-multi-sector-industrial-storm-water-permit-updates-permits If MSGP coverage is required, attach a completed MSGP Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) in Appendix F.

Does the site require MSGP coverage?		<input type="checkbox"/> Yes	<input type="checkbox"/> No
If no, please explain: INSERT TEXT HERE			
If yes:	Has an MSGP NOI been attached in Appendix F?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	Has an MSGP SWPPP been attached in Appendix F?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

If MSGP coverage is required, Section 5 must be completed.

1.3 Site Location Information

Section 1.3 must be filled out entirely for all projects.

1.3.1 Watershed Quality

– To determine if your site is in a 303(d) listed watershed, visit the DEQ Interactive Map here: https://enviro.deq.utah.gov/ . Filter the map to search for Assessed Waters under Water Quality. Select the watershed that your site falls in and check for any Required TMDL (303d list). Examples of impairments may include: Temperature, Dissolved Oxygen, pH, Phosphorus, Benthic Invertebrate Assessment, etc.			
Is the site within a 303(d) listed watershed?		<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes:	Identify the listed impairment(s): INSERT TEXT HERE		
	Is there an approved TMDL?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	If yes, what is the TMDL for? INSERT TEXT HERE		

1.3.2 FEMA Flood Zones

– To determine if your site is in a FEMA Flood Zone, visit the FEMA Flood Map Service Center: https://msc.fema.gov/portal/search?AddressQuery=345%20nd%20street%2C%20ogden%2C%20utah#searchresultsanchor			
Is any portion of the site within a FEMA Flood Zone?		<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes:	What zone is the site in? (e.g., Zone A, Zone AH, etc.) INSERT TEXT HERE		

1.3.3 Drinking Water Source Protection Zones

– To determine if your site is in a drinking water source protection zone, visit the DEQ Interactive Map here: https://enviro.deq.utah.gov/ . Under Drinking Water, filter the map to search for Ground Water Protection Zones.			
Is any portion of the site within a Drinking Water Source Protection Zone?		<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes:	What is the system name? INSERT TEXT HERE		

1.3.4 Wetlands

– To determine if your site is in a designated wetland, visit the Utah Geological Survey Wetland Map here: https://geology.utah.gov/apps/wetlands/index.html .			
Is any portion of the site within a designated wetland?		<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes:	What is the wetland type? INSERT TEXT HERE		

SECTION 2: SITE CHARACTERISTICS

2.1 Site Size and Type

Section 2.1 must be filled out entirely for all projects.

Total site area (lot/parcel size):	acres
Total site area expected to be disturbed by construction activities:	acres
If construction is expected to disturb ≥ 1 acre, coverage under DWQ Permit No. UTRC00000 is required, and Section 5 must be filled out.	

Is the project considered New Development or Redevelopment? [Select one.](#)

- ☐ **New Development:** The existing site is currently undeveloped and consists only of pervious surface (bare soil, vegetation, etc.).
- ☐ **Redevelopment:** The existing site is fully or partially developed with impervious surfaces (pavement, building(s), etc.).

2.1.1 Common Plan of Developments

Section 2.1.1 is required for New Development sites that disturb < 1 acre. If this does not apply, select "No" below and proceed to the next section.

Is this section applicable to the project under consideration?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
– A Common Plan of Development is a site on a subdivided lot that was originally ≥ 1 acre but has been subdivided <u>after October 1992</u> into separate lots that are < 1 acre.		
Is this site considered a Common Plan of Development?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes, coverage under DWQ Permit No. UTRC00000 or UTRH00000 is required, and Section 5 must be filled out.		

2.2 Groundwater Information

Section 2.2 must be filled out entirely for all projects.

Minimum depth to groundwater:	feet
Minimum estimated depth to high groundwater level (wet season conditions):	feet
Source: INSERT TEXT HERE	
Is there any known groundwater contamination at the site?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, briefly describe and attach additional information, as necessary, in Appendix F : INSERT TEXT HERE	

2.3 Soil Information

Section 2.3 must be filled out entirely for all projects.

Hydrologic Soil Group (HSG):	INSERT TEXT HERE		
HSG Source: INSERT TEXT HERE			
Infiltration Rate (Table 1 in SWDM):	inches / hour		
Has a Geotechnical Report and all addendums been attached in Appendix F?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Is there any known soil contamination on the site?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
If yes, briefly describe and attach additional information, as necessary, in Appendix F: INSERT TEXT HERE			

SECTION 3: HYDROLOGICAL DESIGN INFORMATION

Section 3 must be filled out entirely for all projects.

- All developments must provide hydrologic calculations using rational method. Hydrologic calculations must specify:
 - Runoff in cubic feet / second (cfs)
 - Proposed discharge rate (cfs)
 - Impervious drainage area
 - Pervious drainage area
 - Coefficient of runoff (C-value)
 - Time of concentration (minimum allowable is 10 minutes)
 - Average rainfall intensity during time of concentration.

Have hydrologic calculations been attached in Appendix B?		<input type="checkbox"/> Yes	<input type="checkbox"/> No
Total site area (lot/parcel size): Should be same as Section 2.1	acres		
Identify proposed post-construction discharge rate per acre: Retention systems are not allowed to discharge. Detention systems can have a maximum discharge rate of 0.1 cfs/acre.	cfs/acre		
Identify proposed post-construction discharge rate:	cfs		
Has proof of predevelopment flow conditions been attached in Appendix B?		<input type="checkbox"/> Yes	<input type="checkbox"/> No

SECTION 4: HYDRAULIC DESIGN INFORMATION

4.1 Storm Water Storage

Section 4.1 must be filled out entirely for all projects.

Will flood control storm water storage be accomplished through detention or retention?

- ☐ **Detention:** The site is within proximity to connect and discharge to the Ogden Municipal Separate Storm Sewer System (MS4) and the volume of storage will be based on the 25-year storm.
- ☐ **Retention:** It is not feasible to connect to the Ogden MS4. The volume of storage will be based on the 100-year 24-hour storm, with no release, and shall drain within 72 hours.

Total <i>required</i> volume of flood control storm water storage:	cubic feet
Total <i>provided</i> volume of flood control storm water storage:	cubic feet
Have storm water storage volume calculations been attached in Appendix B?	<input type="checkbox"/> Yes <input type="checkbox"/> No

4.1.1 Detained Storm Water

Section 4.1.1 is required for sites that utilize detention for any portion of the required storm water storage volume. If this does not apply, select "No" below and proceed to the next section.

Is this section applicable to the project under consideration?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Identify the proposed volume to be detained:	cubic feet
Diameter of orifice based on proposed discharge rate:	inches
Is orifice size < 3" diameter?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, upsize orifice to 3" diameter and specify new discharge rate: Detention pond may not be resized based on new discharge rate.	cfs
A detail of the control structure is included in Appendix A?	<input type="checkbox"/> Yes <input type="checkbox"/> No

4.1.2 Retained Storm Water

Section 4.1.2 is required for sites that utilize retention for any portion of the required storm water storage volume. If this does not apply, select "No" below and proceed to the next section.

Is this section applicable to the project under consideration?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Identify the proposed volume to be retained:	cubic feet
Identify the infiltration time based on the design storm and infiltration rate:	hours
Will underground retention be implemented?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, has your communications with DWQ for implementing the requirements for underground injection wells been documented in Appendix F? Underground retention facilities may require inventory in DEQ's the Class V Underground Injection Control (UIC) Program required by the Safe Drinking Water Act and DEQ's implementing regulation at UAC R317-7. For the State UIC Contact at DWQ call (801) 536-4300.	<input type="checkbox"/> Yes <input type="checkbox"/> No

4.1.3 Underground Storm Water Storage

Section 4.1.2 is required for sites that utilize underground chambers or structures for any portion of the required storm water storage volume. If this does not apply, select "No" below and proceed to the next section.

Is this section applicable to the project under consideration?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Have design details of the pretreatment system been included in Appendix A? A pretreatment system with offline pollutant storage to capture sediment debris, & other particulates prior to all inlets into the underground system is required.	<input type="checkbox"/> Yes <input type="checkbox"/> No

SECTION 5: WATER QUALITY DESIGN INFORMATION

Section 5. is required for sites which meet the criteria described below. If this does not apply, select "No" below and proceed to the next section.

Is this section applicable to the project under consideration?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> – All developments which meet one or more of the criteria below are required to incorporate Storm Water Quality: <ul style="list-style-type: none"> – Large-Scale Residential, Commercial, Industrial, Institutional, or Mixed-Use sites (see Section 1.1.1) which intend to discharge storm water into the Ogden MS4. – Sites requiring coverage under DWQ Permit No. UTRC00000, UTRH00000 or, UTR000000. – Sites identified as high-use, high-sensitivity, or high-pollutant-potential per Section 1.1.4. – Sites which incorporate underground storm water storage facilities. 		

5.1 80th Percentile Runoff – Water Quality Volume (WQV)

<ul style="list-style-type: none"> – All developments must provide WQV calculations. WQV calculations must specify: <ul style="list-style-type: none"> – Project limits of disturbance or BMP drainage area – Water quality volumetric coefficient calculations based on SWDM Equation 3, 4 or 5 depending on site's hydrologic soil group (HSG) – 80th percentile rainfall depth – Percent of imperviousness of the drainage area in decimal format (80% impervious is equal to 0.8) 	
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Site Location	Corresponding 80 th Percentile Rainfall Depth (d)
<input type="checkbox"/> This site is west of Harrison Blvd.	0.48 inches
<input type="checkbox"/> This site is east of Harrison Blvd.	0.62 inches
Have WQV calculations been attached in Appendix C? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Total <i>required</i> WQV	cubic feet
Total <i>provided</i> WQV:	cubic feet
High water elevation of the 80 th percentile volume:	feet

5.2 Basic Storm Water Treatment: Low Impact Development (LID)

<ul style="list-style-type: none"> – Projects required to incorporate Storm Water Quality must route all storm water through an approved LID Best Management Practice (BMP) and retain the WQV. – Review LID Guide for further guidance.
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5.2.1 Feasibility

Section 5.2.1 is required for sites claiming it is infeasible to retain any portion of the WQV through LID BMPs. If this does not apply, select "No" below and proceed to the next section.

Is this section applicable to the project under consideration?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Specify how much of the total WQV can be retained via LID BMPs. If it is infeasible to retain any of the WQV, then state "0". If any portion of the WQV can be retained, then Section 5.2.2 must be filled out.	cubic feet	

Specify what constraint(s) inhibit feasibility of retaining the full WQV utilizing LID BMPs. Select all that apply.

<input type="checkbox"/>	High groundwater
<input type="checkbox"/>	Contaminated groundwater
<input type="checkbox"/>	Drinking water source protection
<input type="checkbox"/>	Soil conditions (e.g., low infiltration rates)
<input type="checkbox"/>	Excessive slopes
<input type="checkbox"/>	Accessibility

<input type="checkbox"/>	Excessive costs
<input type="checkbox"/>	Other justifiable constraint, please specify: INSERT TEXT HERE
Provide a few sentences to document the constraints that inhibit full WQV retention: INSERT TEXT HERE	
Provide a rationale for the use of alternative water quality design criteria: INSERT TEXT HERE	
Provide quantification that LID has been used to the maximum extent feasible: INSERT TEXT HERE	
Additional information and/or documentation may be required. Any additional information and/or documentation can be attached in Appendix D.	

5.2.2 LID BMP Selection

Section 5.2.2 is not required for sites claiming it is infeasible to retain the [full WQV](#) through LID BMPs. If this does not apply, select “No” below and proceed to the next section.

Is this section applicable to the project under consideration?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
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Specify which LID Best Management Practice(s) (BMPs) will be used: [Select all that apply.](#)

LID BMP Selection		Ogden City Project Use Approval		WQV Retained
		Public	Private	
<input type="checkbox"/>	Rain Garden		✓	cubic feet
<input type="checkbox"/>	Bioretention Cell	✓	✓	cubic feet
<input type="checkbox"/>	Bioswale	✓	✓	cubic feet
<input type="checkbox"/>	Vegetated Strip	✓	✓	cubic feet
<input type="checkbox"/>	Tree Box Filter	✓	✓	cubic feet
<input type="checkbox"/>	Green Roof		✓	cubic feet
<input type="checkbox"/>	Pervious Surface			cubic feet
<input type="checkbox"/>	Infiltration Trench	✓	✓	cubic feet
<input type="checkbox"/>	Dry Well	✓	✓	cubic feet
<input type="checkbox"/>	Underground Infiltration Galleries	✓	✓	cubic feet
<input type="checkbox"/>	Harvest and Reuse		✓	cubic feet
<input type="checkbox"/>	Other, please describe: INSERT TEXT HERE			cubic feet
Sum of WQV retained by selected LID BMPs				cubic feet
Have design details, specifications, and calculations of each proposed LID BMP been included in Appendix D? Must show effectiveness of treatment.				<input type="checkbox"/> Yes <input type="checkbox"/> No
If LID BMPs were selected using the LID BMP Selection Flow Charts available in the LID Guide, have the marked-up flow charts been attached in Appendix D?				<input type="checkbox"/> Yes <input type="checkbox"/> No
If no, describe the design decisions made in selecting the proposed LID BMPs: INSERT TEXT HERE				

5.3 Storm Water Manufactured Treatment Device (MTD)

Section 5.3 is required for sites which meet the criteria described below. If this does not apply, select “No” below and proceed to the next section.

Is this section applicable to the project under consideration?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> – All developments which meet one or more of the qualifications below are required to incorporate an MTD designed and sized to treat the Water Quality Flow (WQF) as defined in the SWDM: <ul style="list-style-type: none"> – All sites claiming LID BMP infeasibility in Section 5.2.1. – Large-Scale Residential, Commercial, Industrial, Institutional, or Mixed-Use sites (see Section 1.1.1) which intend to discharge storm water into the Ogden MS4. – Sites identified as high-use, high-sensitivity, or high-pollutant-potential per Section 1.1.4. – Sites which incorporate underground storm water storage facilities must include an MTD upstream of storm water storage. 		

Specify the MTD or MTDs to be installed: INSERT TEXT HERE		
Have the MTD(s) been verified through NJCAT program to remove 50% total suspended solids (TSS) with median particle size of 75 microns?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Has the NJDEP Certification been attached in Appendix D for each proposed MTD?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have design details, specifications, and calculations of each proposed MTD been included in Appendix D? Must show effectiveness of treatment.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have WQF calculations been attached in Appendix C?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Total required WQF:	cubic feet / second	
Maximum WQF the MTD is capable of treating:	cubic feet / second	

SECTION 6: SUMMARY OF STORM WATER MANAGEMENT DESIGN

Section 6 must be filled out entirely for all projects.

Provide a summary description of all storm water facilities, BMPs, and control measures installed or to be installed on the site: [INSERT TEXT HERE](#)

6.1 Site Plans and Maps

- In Appendix A, attach plans and maps which include enough detail to meet all requirements of the SWDM (see SWDM Appendix A).

Have all required site plans and maps been included in Appendix A?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Required plans and maps may include but may not be limited to the following. Please identify if each of the following items have been included in the plans and maps provided:		
Landscaping & irrigation plan	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Grading & drainage plan	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Site location relative to nearby surface waters and other sensitive areas such as FEMA floodplains, drinking water source protection zones, and wetlands	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Pipe and conveyance sizes, slopes, invert elevations, material, strength class, clearances between other utilities, minimum cover, etc.	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Peak velocity of all new and impacted conveyance systems	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Size of and distance between all adjacent manholes	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Size of and distance between all adjacent inlets	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Type of storm water storage facility being utilized	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Details for the storage facility (manufacture details, basin cross section, etc.)	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Relevant elevations of the storage facility (top, bottom, high water, outlet/orifice, etc.)	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Maintenance access location and design slopes (min & max) within the basin(s)	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Emergency overflow path to the public ROW	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Design details for the pretreatment system and control structure, including elevations	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Size and elevation of the orifice	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Highwater elevation of the 80 th percentile volume	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
Minimum distances between storm water storage and conveyance systems from all other utilities	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
All relevant Ogden City Standard details	<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
For all items identified as "N/A" above, describe: INSERT TEXT HERE		

SECTION 7: STANDARD OPERATING PROCEDURES (SOPs)

Section 7 must be filled out entirely for all projects.

– In accordance with the LTSWM Agreement, the LTSWM Plan must establish the standard operation and routine maintenance procedures for the Stormwater Facilities, and control measures installed on the Property.		
Are all proposed storm water facilities equipped with suitable access for inspection, maintenance, and/or repair?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

7.1 Operations and Maintenance (O&M) SOP

Has an O&M SOP which covers all storm water facilities on site been included in Appendix E?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes, does the O&M SOP include:		
<ul style="list-style-type: none"> Any operational practices to be employed to ensure proper function of the storm water management facility. 	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> The equipment and skills or training necessary to operate and maintain the storm water management facility. 	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> All parts or components of a storm water management facility that need to be maintained. 	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> A detailed description of how the storm water management facility shall be maintained. 	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> Who will be responsible for maintenance. 	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> The anticipated frequency of how often maintenance will be necessary to maintain proper function. 	<input type="checkbox"/> Yes	<input type="checkbox"/> No

7.2 Inspection SOP

Has an Inspection SOP which covers all storm water facilities on site been included in Appendix E?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes, does the Inspection SOP include:		
<ul style="list-style-type: none"> How an inspection is to be performed and include <u>a checklist of facility elements</u> that will be verified during the inspection. 	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> Include specific details of visual indicators which constitute proper condition for each element in the checklist as well as visual indicators that constitute maintenance necessity. 	<input type="checkbox"/> Yes	<input type="checkbox"/> No

LTSWM PLAN APPENDICES

Attach the following documentation to the LTSWM Plan:

Appendix A - Site Plans and Maps

Appendix B - Hydrologic and Hydraulic Calculations

Appendix C - Water Volume Calculations

(e.g., Water Quality Volume (WQV) and Water Quality Flow (WQF) calculations)

Appendix D - Water Quality Design Information

(e.g., Information on LID BMP infeasibility, design details, specifications, and calculations of all proposed LID BMPs or MTDs, marked-up LID BMP selection flow charts, MTD NJDEP Certification, etc.)

Appendix E - Standard Operating Procedures (SOPs)

Appendix F - Additional Information

(e.g., Geotechnical reports, soil reports, details of known soil or groundwater contamination, UIC program inventory documentation, or other permit documents such as MSGP, stream alteration, wetland, etc.)

APPENDIX A: SITE PLANS AND MAPS

APPENDIX B: HYDROLOGIC AND HYDRAULIC CALCULATIONS

APPENDIX C: WATER VOLUME CALCULATIONS

WATER QUALITY VOLUME (WQV) AND WATER QUALITY FLOW (WQF) CALCULATIONS

APPENDIX D: ADDITIONAL WATER QUALITY DESIGN INFORMATION

Include any information on LID BMP infeasibility, design details, specifications, and calculations of all proposed LID BMPs or MTDs, marked-up LID BMP selection flow charts, MTD NJDEP Certification, etc.

APPENDIX E: STANDARD OPERATING PROCEDURES (SOPs)

APPENDIX F: ADDITIONAL INFORMATION

Include any additional information such as geotechnical reports, soil reports, details of known soil or groundwater contamination, UIC program inventory documentation, or other permit documents such as MSGP, stream alteration, wetland, etc.)