

DRAINAGE PLAN REQUIREMENTS

CITY OF WEST JORDAN
Engineering Department
8000 South Redwood Road
West Jordan, Utah 84088

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**SITE DEVELOPMENT
STORM DRAINAGE AND EROSION CONTROL
PLANNING SUBMITTAL REQUIREMENTS**

1. REVIEW PROCESS

All subdivisions, Planned Unit Development or any other development or redevelopment done within the jurisdiction of these CRITERIA shall be required to submit drainage reports, plans, construction drawings, specifications and as-constructed information in conformance to the requirements of these CRITERIA. The sequence of submittal, City review and approval for Planned Unit Developments is shown on Figures IV-1 and IV-2. Drainage aspects of these submittals are provided below. It is fully anticipated that the drainage components identified below will be included within the full submittal provided by the developer.

1.1 Subdivision Process The general requirements for the subdivision of land in City of West Jordan, and conditions requiring subdivision, are set forth in the City of West Jordan Development Code. readers are referred to the development code for standards and procedures for the review and approval of subdivision plats.

1.2 Permit Process Any structure, or other development or redevelopment, which requires a building permit under the City of West Jordan code may also require a City Storm Drainage Permit to be issued by the City of West Jordan Public Works Department. These permits will only be issued upon conformance to requirements contained in these and other applicable CRITERIA as evidenced by approval of the Final Drainage Report.

A summary of submittals which are required of the developer to be submitted for Planning Commission review and approval include:

- A. Conceptual Level Drainage Control Plan. This plan is to be submitted for review by the City of West Jordan Flood Control Director for conceptual level feasibility.
- B. Preliminary Plan. This plan is to be submitted for review and preliminary approval by City of West Jordan Planning Commission and City Commission.
- C. Final Drainage Plan. The final drainage plan will be submitted subsequent to preliminary approval and must receive approval from both the Planning Commission and City Commission. It is requested that review meetings be held with the developer prior to the preparation of the final drainage plan, and again prior to the development of final construction details and documents to help avert potential problems with final design. These meetings would be held prior to formal submittal of the final plans to the City Planning Commission and City Commission.

The requirements for each of these plans are found within the following sections.

<u>Plan</u>	<u>Section</u>
Conceptual Level Drainage Control Plan	2
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2. CONCEPTUAL LEVEL DRAINAGE CONTROL PLAN

At the conceptual level the following general project information shall be provided to City of West Jordan for review and approval prior to the development of a Preliminary Plan.

General Location and Description of Project

1. Township, range, section, 1/4 section, (subdivision, lot and block).
2. Major drainageways and facilities.
3. Area in acres.
4. Proposed land use.

Drainage Basins and Sub-basins

1. Reference to major drainageway planning studies such as flood hazard delineation report, major drainageway planning reports, and flood insurance rate maps.

Drainage Design Criteria

1. Proposed drainage concept and how it fits existing drainage patterns.
2. Discussions of drainage problems, including stormwater quality, and potential solutions at specific design points.
3. Discussion of detention storage and outlet design.

Identification of Potential Improvements to Public Drainage Systems

1. Identification of potential design concepts and impacts to local drainage systems.

3. PRELIMINARY DRAINAGE CONTROL PLANS

At the time of land zoning, rezoning, or proposal for development or redevelopment, a preliminary drainage report is required in advance of the final drainage report. Ten copies of the preliminary drainage report, prepared and signed by a Professional Engineer registered in the State of Utah, shall be submitted to the Planning Commission for review. Reports shall be cleanly and clearly reproduced and legible throughout. Blurred or unreadable portions of the report will be deemed unacceptable and will require resubmittal. Incomplete or absent information may require resubmittal of the report.

The purpose of a preliminary report is to define on a conceptual level the nature of the proposed development or project and to describe all existing conditions and propose facilities needed to conform to the requirements of these CRITERIA. Each preliminary drainage report shall provide the following report information and mapping. It is recommended that the Preliminary Plan prepared by the developer follow the general outline provided below to facilitate City review.

REPORT CONTENT

General Location and Description

A. Location

1. City, County, State Highway and local streets within and adjacent to the site, or the area to be served by the drainage improvements.

2. Township, range, section, 1/4 section, (subdivision, lot and block).
3. Major drainageways and facilities.
4. Names of surrounding developments.
5. Name of receiving water(s).

B. Description of Property

1. Existing ground cover (type and vegetation).
2. Area in acres.
3. Existing major irrigation facilities such as ditches and canals.
4. Proposed land use and ground cover.

Drainage Basins and Sub-basins

A. Major Basin Description

1. Reference to major drainageway planning studies such as flood hazard delineation report, major drainageway planning reports, and flood insurance rate maps.
2. Major basin drainage characteristics, and existing and planned land uses within the basin, as defined by the planning commission.
3. Identification of all nearby irrigation facilities that will influence or be influenced by the local drainage.

B. Sub-Basin Description

1. Describe historic drainage patterns of the property.
2. Describe offsite drainage flow patterns and impact on development under existing and fully developed basin conditions.

Drainage Facility Design Criteria

A. General Concept. Discuss the following:

1. Proposed drainage concept and how it fits existing drainage patterns.
2. How offsite runoff will be considered and how expected impacts will be addressed.
3. Anticipated and proposed drainage patterns.
4. Stormwater quantity and quality management concept and how it will be employed. The use of computer based models for the evaluation of stormwater quality and quantity will not be universally required of new developments, although their use is recommended. Under site specific conditions where it is believed by the City that impacts from the development may unacceptably impact downstream water quality or quantity however, their use may be required. The recommendation to use computer modeling during the evaluation process is made since it is likely that the review process will check the validity of the developers conclusions utilizing SEDIMOT or other appropriate computer technology.
5. Maintenance and maintenance access.
6. Describe the content of tables, charts, figures, plates, drawings and design calculations presented in the report.

B. Specific Details (Optional Information)

1. Discussions of drainage problems, including stormwater quality, and solutions at specific design points.
2. Discussion of detention storage and outlet design.
3. Discussion of impacts of concentrating flow on downstream properties.

Public Drainage Improvements

If the project requires that drainage improvements be constructed that will be turned over and owned and maintained by City of West Jordan, the following must also be provided, obtained, or completed:

- A. A preliminary plan and/or design of the public improvement.

References

- A. Reference all criteria, master plans, and technical information used in support of concept.

MAPPING

Preliminary Report Mapping

- A. The General Location Map shall show the following information and conform to the following standards.
 - 1) All drawings shall be 22" x 34" in size.
 - 2) Map shall provide sufficient detail to identify drainage flows entering and leaving the development and general drainage patterns.
 - 3) The general location map should be at a scale of 1" = 500' to 1" = 4000' and show the path of all drainage from the upper end of any offsite basins to the defined major drainageways.
 - 4) Identify all major facilities (i.e., irrigation ditches, existing detention facilities, stormwater quality facilities, culverts, storm sewers) downstream of the property along the flow path to the nearest major drainageway.
 - 5) Basins, basin identification numbers, drainage divides, and topographic contours are to be included.
- B. Floodplain Mapping:
 - 1) A copy of any published floodplain maps (i.e., flood hazard area delineation, flood insurance rate maps)
 - 2) All major drainageways shall have the defined floodplain shown on the report drawings.
 - 3) Flood hazards from either shallow overland flow, side channels, or concentrated flows.
 - 4) The location of the property in relation to the floodplain(s) and/or flood hazards.
- C. Drainage Plan Mapping:
 - 1) Prepare at a scale of 1" = 20' to 1" = 200' on a 22" x 34" size drawing sheet.
 - 2) Existing topographic contours at 2-feet (or less) intervals, In mountainous areas, the maximum interval may be extended to 5 feet. Final plan approval 1 foot contour intervals shall be shown for areas of little relief. The contours shall extend a minimum of 100-feet beyond the property lines.
 - 3) All existing drainage facilities within map limits including basin boundaries and sub-boundaries.
 - 4) Conceptual major drainage facilities including proposed stormwater quality BMPs, detention basins, storm sewers, swales, riprap, and outlet structures in the detail consistent with the proposed development plan.
 - 5) Any offsite feature including drainage that influences the development.
 - 6) Proposed drainage patterns and, if available, proposed contours.
 - 7) Legend to define map symbols.
 - 8) Project name, address, engineering firm and seal, and date the Title block in lower right corner.

9) North arrow, scale and available bench mark information and location for each benchmark.

4. FINAL DRAINAGE CONTROL PLANS, PLAT, DOCUMENT & CONSTRUCTION SPECIFICATIONS

The final drainage report serves to define and expand the concepts shown in the preliminary report or is sufficient of itself to assure conformance to these CRITERIA. The final report may be submitted at any point during the permitting and platting process, but must be reviewed and approved prior to issuance of any permit.

Ten (10) copies of the report shall be submitted to the Planning Commission. Reports shall be typed and bound on 8-1/2" x 11" paper with pages numbered consecutively. Drawings, figures, tables, etc., shall be bound with the report or contained in an attached pocket. The report shall include a cover letter presenting the design for review prepared or supervised by a Professional Engineer licensed in the State of Utah. The report shall contain a certification that reads as follows:

"This report for the drainage design of (name of development) was prepared by me (or under my direct supervision) in accordance with the provisions of the City of West Jordan storm drainage design and technical criteria, and was designed to comply with the provisions thereof. I understand that City of West Jordan does not and will not assume liability for drainage facilities design."

Registered Professional Engineer
State of Utah No. _____
(Affix Seal)

REPORT CONTENT

The report shall be in accordance with the following outline and contains the following applicable information:

General Location and Description

- A. Location
 - 1. Information as required for Preliminary Plans.
 - 2. Local streets within the adjacent to the subdivision.
 - 3. Easements within and adjacent to the site.
- B. Description of Property
 - 1. Information as required for Preliminary Plans.
 - 2. General project description.
 - 3. Area in acres.
 - 4. General soil conditions, topography, and slope.
 - 5. Irrigation facilities.

Drainage Basins and Sub-basins

- A. Major Basin Description
 - 1. Information as required for Preliminary Plans.

2. Identification of all irrigation facilities within the basin that will influence or be influenced by proposed site drainage.

B. Sub-Basin Description

1. Information as required for Preliminary Plans.

Drainage Facility Design Criteria

The use of computer based models for the evaluation of stormwater quality and quantity will not be universally required of new developments, although their use is recommended. Under site specific conditions where it is believed by the City that impacts from the development may unacceptably impact downstream water quality or quantity however, their use may be required. The recommendation to use computer modeling during the evaluation process is made since it is likely that the review process will check the validity of the developers conclusions utilizing SEDIMOT or other appropriate computer technology.

The design criteria used in the development of the drainage plan should be clearly identified including a discussion related to the use or implementation of any optional provisions intended by the developer or any deviation from the CRITERIA. Any deviation from the CRITERIA must be fully justified in the final design report. Development criteria should consider and discuss the following:

A. Previous Studies and Specific Site Constraints

1. Previous drainage studies (i.e., project master plans) for the site that influence or are influenced by the drainage design and how implementation of the plan will affect drainage and stormwater quality for the site.
2. Potential impacts identified from adjacent drainage studies.
3. Drainage impacts of site constraints such as streets, utilities, transitways, existing structures, and development or site plan.

B. Hydrologic Criteria

1. Design storm rainfall and its return period(s).
2. Runoff calculation method(s).
3. Detention discharge and storage calculation method(s).
4. Discussion and justification of other criteria or calculation methods used that are not presented in or referenced by the CRITERIA.

C. Hydraulic Criteria

1. Identify various capacity references.
2. Discussion of other drainage facility design criteria used that are not presented in these CRITERIA.

D. Stormwater Quality Criteria

1. BMPs to be used for stormwater quality control.
2. Identify, as appropriate, water-quality capture volume and drain time for extended-detention basins, retention ponds and constructed wetland basins.
3. Identify, as appropriate, runoff volume and flow rates for design of water-quality swales, wetland channels, etc.
4. Discussion of other drainage facility design criteria used that are not presented in these CRITERIA or other manuals referenced by City of West Jordan.

E. Waivers from Criteria

1. Identify provisions by section number for which a waiver is requested.
2. Provide justification for each waiver requested.

Drainage Facility Design Discuss the following:

- A. Proposed concept and typical drainage patterns.
- B. Compliance with offsite runoff considerations.
- C. Anticipated and proposed drainage patterns.
- D. Proposed stormwater quality management strategy.
- E. The content of tables, charts, figures, plates, or drawings presented in the report.
- F. Drainage problems encountered and solutions at specific design points.
- G. Detention storage and outlet design.
- H. Stormwater quality BMPs to be used.
- I. Maintenance access and aspects of the design.
- J. Easements and tracts for drainage purposes, including the conditions and limitations for use.

Public Drainage Improvements

If the project requires that drainage improvements be constructed that will be turned over and owned and maintained by City of West Jordan, the following must also be provided, obtained, or completed:

- A. Two sets of plans (22" x 34") submitted for initial review.
- B. An application to design, plan, construct, re-construct or remodel a public improvement must be filed with the Planning Commission.
- C. An bond or letter of credit guaranteeing payment and performance must be executed prior to commencing with work on the project.
- D. Upon completion of the project, a set of reproducible as-constructed plans, certified by a licensed engineer, must be submitted before the bond or other guarantee is released.
- E. After approval of the initial review set, ten (10) sets of plans must be supplied which will be distributed by the City for review by all departments and utility companies. After comments are received and addressed four (4) final sets will be stamped as approved and returned to the design engineer for use by the contractor and owner.

The information required for the plans shall be in accordance with sound engineering principles, the technical provisions of any City manuals (where appropriate), these CRITERIA, and other applicable City of West Jordan ordinances, regulations, criteria or design guidelines. The plans may also be subject to review by outside agencies such as JTAC, Federal Emergency Management Agency, U.S. Army Corps of Engineers, Environmental Protection Agency, Utah Water, or other agencies as required. The plans shall be signed and sealed by a Professional Engineer registered in the state of Utah.

Conclusions

The Proposed Drainage Facility Plan will be evaluated based upon the material and data submitted in accordance with these CRITERIA and other manuals referenced by City of West Jordan. The plan must evaluate the effectiveness of the drainage design in controlling damage from storm runoff, in removing pollutants from storm runoff, and its potential influence on downstream drainages.

References

Reference all criteria and technical information used.

Appendices

Appendices should include all backup and supporting materials including:

- A. Hydrologic Computations (Including computer model input and output listings.)
 - 1. Land use assumptions regarding adjacent properties.
 - 2. Initial and major storm runoff at specific design points.
 - 3. Historic and fully-developed runoff computations at specific design points.
 - 4. Hydrographs at critical design points.
 - 5. Time of concentration and runoff coefficients for each basin.
 - 6. Stormwater quality BMP sizing calculations including runoff adjustments for minimizing directly-connected impervious areas.
- B. Hydraulic Computations(Including computer model input and output listings.)
 - 1. Culvert capacities.
 - 2. Storm sewer capacity, including energy grade line (EGL) and hydraulic grade line (HGL) elevations.
 - 3. Gutter capacity as compared to allowable capacity.
 - 4. Storm inlet capacity including inlet control rating at connection to storm sewer.
 - 5. Open channel design.
 - 6. Check and/or channel drop design.
 - 7. Detention area/volume capacity and outlet capacity calculations for flood detention and water quality basins; depths of detention basins.
 - 8. Wetland area and area/depth distribution for constructed wetland basins.
 - 9. Infiltration rates and volumes for porous pavement or release rates where underdrains or infiltration is not possible.
 - 10. Flow rates, velocities, longitudinal slopes and cross-sections for wetland channels and water quality swales.
 - 11. Downstream/outfall system capacity to the Major Drainageway System.

MAPPING

Final Report Mapping

- A. General Location Map. Shall include all items as identified for the Preliminary Plan.
- B. Floodplain Mapping. Shall include all items as identified for the Preliminary Plan.
- C. Drainage Plan Mapping. In addition to those items identified for the development of the Preliminary Plan, Drainage mapping shall include the following:
 - 1. Property lines, existing easements, and easements proposed for dedication, with purposes noted.
 - 2. Streets, indicating ROW width, flowline width, curb or roadside swale type, sidewalk, and approximate slopes.
 - 3. Existing drainage facilities and structures, including irrigation ditches, roadside ditches, crosspans, drainageways, gutter flow directions, and culverts. Also show pertinent information such as material, size, shape, slope and locations.
 - 4. Proposed type of street flow (i.e., vertical or combination curb and gutter), roadside ditch or swale, gutter, slope and flow directions, and cross pans.
 - 5. Proposed storm sewers and open drainageways, including inlets, manholes, culverts, and other appurtenances, including riprap or other erosion protection.

6. Proposed structural water-quality BMPs, their location, sizing, and design information.
7. Proposed outfall point for runoff from the developed area and, if required, facilities to convey flows to the final outfall point without damage to downstream properties.
8. Routing and accumulation of flows at various critical points for the initial and water-quality storm runoff events, and major storm runoff events.
9. Volumes and release rates for detention storage and water-quality capture volume for facilities and information on outlet works.
10. Location and water surface profiles or elevations of all previously defined floodplains affecting the property. If floodplains have not been previously published, they shall be defined and shown on the drainage plan.
11. Location, and measured or estimated elevations, of all existing and proposed utilities affected by or affecting the drainage design.
12. Routing of upstream offsite drainage flow through or around the development.
13. Location of any improvements included in the appropriate or accepted outfall system plan, major drainage plan, and/or storm drainage plan.
14. Definition of flow path leaving the development through the downstream properties ending at a major drainageway or receiving water.

CONSTRUCTION PLANS

For on-site drainage improvements, the final construction plans (22" x 34") shall be submitted after approval of the Final Drainage Report. Ten (10) sets of plans shall be submitted for approval. Upon approval, four sets, stamped and signed, will be returned to the design engineer for use by the contractor, owner and design engineer. However, before any construction work begins, appropriate bonds, letters-of-credit, or other surety as required by these CRITERIA should be issued to City of West Jordan. The construction plans as a minimum and as appropriate will include:

- A. Plan and profile of proposed pipe installations, inlets and manholes with pertinent elevations, dimensions, type and horizontal control shown.
- B. Property and right-of-way lines, existing and proposed structures, fences and other land features.
- C. Plan and profile of existing and proposed channels, ditches swales, and on-site water-quality BMPs with construction details, cross-sections and erosion controls.
- D. Detention and water quality (if separate) facility grading, trickle channels (if any), outlet and inlet location, cross-sections or contours sufficient to verify volumes, etc.
- E. Details of inlet and outlet control devices and of all structural components being constructed.
- F. Maintenance access.
- G. General overlot grading and the erosion and sediment control plan prepared in accordance with applicable provisions of these CRITERIA and the MANUAL.
- H. Areas of modular block porous pavement, if any, and installation details.
- I. Landscaping and revegetation plans and details.
- J. Proposed finish floor elevations of structures.
- K. Relation of site to current and, if appropriate, modified floodplain boundaries.
- L. A statement agreeing to maintain and operate all privately-owned facilities (if any) in a working manner and/or in accordance with the requirements of the Utah Water Quality Control Division specified in the stormwater discharge permit issued to City of West Jordan.
- M. Signature and seal of a professional engineer preparing these plans.

Approval by City of West Jordan does not constitute an approval or the issuance of permits by the State of Utah, which approval and/or permits shall be obtained prior to initiating any construction activities on the site.

5. AS-BUILT DRAWINGS AND CERTIFICATION

Upon completion of construction, the professional engineer that prepared the design plans (or a professional engineer that assumes the responsibility for the inspection if the design engineer is no longer available) shall provide City of West Jordan with a signed and sealed Certification of Inspection verifying that all work was performed in accordance with the approved plans and in compliance with all applicable criteria of City of West Jordan and that any changes which occurred during construction are included in the as-built drawings. Special circumstances may require that as-built reproducible drawings of the drainage improvements also be provided. Certification of Inspection and as-built drawings (if required) will be required prior to the issuance of a final sewer connection permit or the issuance of a Certificate of Occupancy.