

SITE DEVELOPMENT STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA

TOWN OF ELIZABETH, COLORADO

DRAINAGE PLANNING SUBMITTAL REQUIREMENTS

1. REVIEW PROCESS

All subdivisions, resubdivisions, Planned Unit Developments or any other development or redevelopment done within the jurisdiction of the Town of Elizabeth (TOWN) shall be required to submit drainage reports, plans, construction drawings, specifications and as-constructed information in conformance to the requirements contained herein, hereafter referred to as CRITERIA. The TOWN has adopted the Urban Drainage and Flood Control District's Urban Storm Drainage Criteria Manual, hereafter referred to as MANUAL. All submittals required by these CRITERIA shall satisfy the applicable provisions of the MANUAL.

1.1 Subdivision Process

The general requirements for the subdivision of land in the TOWN and conditions requiring subdivision, are set forth in Title 9 of Elizabeth Municipal Code.

2. DRAINAGE REPORT

Depending on the size and complexity of the drainage system, both a preliminary and final drainage report may be required. Three (3) copies of the drainage report, prepared and signed by a Professional Engineer registered in the State of Colorado, shall be submitted to the Director of Community Development for review. The submittal shall include a declaration of the type of report submitted (i.e., Preliminary or Final). Standard Form SF-1 (Preliminary) or SF-2 (Final) will be used to determine the adequacy of the submittal. The TOWN will review the report and provide written review comments and/or approval within fifteen (15) working days after submittal. The TOWN will make every effort to effect a complete review and comment within the review period. However, the TOWN cannot approve reports or plans by default.

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 applicant shall note that approval of construction plans, specifications, and associated engineering reports by the TOWN shall indicate only that the plans, specifications, and reports are in conformance with submittal requirements and current design criteria, that standard engineering principles and practices appear to have been followed, and that the plans and reports appear to be in conformance with existing approved plans and reports: approval shall not indicate that all assumptions, calculations, and conclusions contained therein have been thoroughly verified by the TOWN. The professional engineer submitting the plans, specifications, and reports shall, at all

times, be solely responsible for their accuracy and validity. If during the construction process, or at any time within two years following the acceptance by the TOWN of the completed improvements, any deficiencies or errors are discovered in the plans, specifications, reports or in the actual improvements as built, the TOWN shall have the right to require any and all corrections which may be deemed necessary by the TOWN. The costs associated with any such corrections shall be the sole responsibility of the developer. Decisions by TOWN Staff members requiring the developer or engineer to make corrections and bear the costs thereof may, upon written request made within fifteen (15) days of the TOWN's written notification to the developer or consultant, be appealed to the Town Administrator or his designee for review. The written request must contain the specific facts upon which the appeal is based. The Town Administrator or designee will decide the appeal in writing within two weeks of receiving said appeal.

A pre-submittal conference is suggested in cases involving large development or redevelopment or where special conditions or problems have become apparent during the development review process.

2.1 Preliminary Drainage Report

At the time of land zoning, rezoning, or proposal for development or redevelopment, a preliminary drainage report may be required in advance of the final drainage report.

2.2 Preliminary Drainage Report Contents

The purpose of the Preliminary Drainage Report is to identify and define conceptual solutions to drainage problems which may occur on site and off site as a result of development. In addition, problems that exist on site prior to development shall be addressed during the preliminary phase.

All reports shall be typed and bound on 8 1/2" x 11" paper with pages numbered consecutively. Any drawings, figures, plates and/or tables shall be bound with the report or included in folders/pockets attached inside the back cover of the report. The report shall be prepared or supervised by an engineer licensed in Colorado.

It should be emphasized that many of the requirements described in the following report format may not be possible to meet. For example, there may be no master drainage plan or defined flood plain for a particular major drainage way. Where this is the case, these facts shall be discussed and the absence of certain information noted. The report format is intended to be a guideline, and as such, shall not necessarily prohibit the completion of a drainage study due to lack of specific information. However, the report shall be as complete as the factual situation will allow.

Each preliminary drainage report shall provide the following:

I. GENERAL LOCATION AND DESCRIPTION

A. Location

1. Township, range, section, 1/4 section, (subdivision, lot and block, if applicable).
2. State Highway and local streets within and adjacent to the site, or the area to be served by the drainage improvements.
3. Major drainageways and facilities.
4. Names of surrounding developments.

B. Description of Property

1. Area in acres.
2. Existing ground cover (type of trees, shrubs and vegetation).
3. Existing major irrigation facilities such as ditches and canals.
4. Proposed land use and proposed ground cover.
5. Identification of all wetland areas with total wetland acreages given.

II. DRAINAGE BASINS AND SUB-BASINS

A. Major Basin Description

1. Reference to major drainageway planning studies (if any) such as flood hazard delineation reports, major drainageway planning reports, and flood insurance rate maps.
2. Describe major basin drainage characteristics, and existing and planned land uses within the basin, as defined by the Director of Community Development.
3. Identify all irrigation facilities within the basin that will influence or be influenced by the proposed site drainage.
4. Identify (include ownership) all lakes and ponds which either influence or may 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. This may require delineation and mapping of off site drainage basins.

III. DRAINAGE FACILITY DESIGN

A. General Concept

1. Discuss proposed drainage concept and how it fits existing drainage patterns.
2. Discuss how offsite runoff will be considered and how expected impacts will be addressed.
3. Discuss stormwater quantity and quality management concept and how it will be employed.
4. Describe the content of tables, charts, figures, plates, drawings and design calculations presented in the report.
5. Discuss maintenance and maintenance access as it relates to drainage and drainage structures.
6. Discuss wetlands issues (if any), mitigation, replacement, etc.

B. Specific Details

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

C. Variances from CRITERIA and/or MANUAL

1. Identify provisions by section number for which a variance is requested.
2. Provide specific and detailed justification for each variance requested.

IV. SUMMARY/CONCLUSIONS

- A. Provide overall summary including conclusions and professional opinions on the adequacy of the proposed facilities.
- B. Include an engineer's certification that reads as follows:

“This report for the preliminary drainage design of (Name of Development) was prepared by me (or under my direct supervision) in accordance with the provisions of Town of Elizabeth Storm Drainage Design and Technical Criteria, and was designed

to comply with the provisions thereof. I understand that the Town of Elizabeth does not and will not assume liability for drainage facilities designed by others.”

SIGNATURE: _____
Registered Professional Engineer
State of Colorado
No. _____
(Affix Seal)

V. REFERENCES

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

2.3 Preliminary Drainage Report Drawing Contents

- (a) General Location Map: All drawings shall be 24” x 36” in size. A map shall be provided in sufficient detail to identify drainage flows entering and leaving the development and general drainage patterns. 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. The map shall identify all major construction (i.e., development, irrigation ditches, existing detention facilities, stormwater quality facilities, culverts, storm sewers, etc.) along the entire path of drainage. Basins and divides shall be identified and topographic contours shall be included.
- (b) Flood Plain Information: Flood plain limits (if any) shall be shown on all report drawings. The source and date of the flood plain limits shown (e.g., flood hazard area delineation, flood insurance rate map, etc.) shall be noted on the drawings.
- (c) Drainage Plan: Map(s) of the proposed development at a scale of 1” = 20' to 1” = 200' (or of sufficient scale to portray the drainage plan in adequate detail) on a 24” x 36” drawing shall be included. The plan shall show at least the following:
 - 1. Existing topographic contours (dashed lines) at 2-feet maximum intervals. In areas of little relief, 1-foot contours shall be shown. In terrain where the slope exceeds 15%, the maximum interval is 5 feet. The contours shall extend a minimum of 100 feet beyond the property lines.
 - 2. Proposed topographic contours (solid lines) at 2-feet maximum intervals. In areas of little relief, 1-foot contours shall be shown. Proposed contours shall match existing contours around the boundary of the proposed project.
 - 3. Existing vegetation.
 - 4. All existing wetland areas.

5. Property lines and easements with purposes noted.
6. Building outlines and first floor elevations of all existing and proposed structures.
7. Streets, if applicable, indicating ROW width, sidewalks, etc.
8. Existing drainage facilities and structures within map limits, including irrigation ditches, roadside ditches, drainageways, gutters, inlets, detention basins and culverts.
9. Major drainage basin boundaries and sub-boundaries.
10. Conceptual major drainage facilities including proposed stormwater quality Best Management Practices (see MANUAL, Volume 3), detention basins, storm sewers, swales, riprap, and outlet structures in the detail consistent with the proposed development plan.
11. Flooding limits based on available information.
12. Any offsite feature that influences the proposed development drainage.
13. Proposed drainage patterns, including flow direction arrows.
14. Legend to define map symbols.
15. Project name, address, engineering firm and seal, and original and revision dates in title block in lower right corner.
16. North arrow, scale and available bench mark information and location for each bench mark.

3. FINAL DRAINAGE REPORT

The final drainage report serves to define and expand the concepts shown in the preliminary report and presents the final design details for the drainage facilities discussed in the Preliminary Drainage Report. This report must be written in such a manner, and contain enough detail, that it is self-explanatory (i.e., possession of the Preliminary Drainage Report is not necessary to understand the Final Drainage Report). 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.

Three (3) copies of the report shall be submitted to the Director of Community Development. 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 attached pockets. The report shall include a cover letter presenting the design for review prepared or supervised by a Professional Engineer licensed in the State of Colorado.

It should be emphasized that many of the requirements described in the following report format may not be possible to meet. For example, there may be no master drainage plan or defined flood plain for a particular major drainage way. Where this is the case, these facts shall be discussed and the absence of certain information noted. The report format is intended to be a guideline, and as such, shall not necessarily prohibit the completion of a drainage study due to lack of specific information. However, the report shall be as complete as the factual situation will allow.

The developer or his consultant is responsible for obtaining any and all permits, licenses, and any other documentation/correspondence that are necessary to address any wetlands issues impacting the given project.

3.1 Final Drainage Report Contents

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

I. GENERAL LOCATION AND DESCRIPTION

A. Location

1. Township, range, section, 1/4 section (subdivision, lot and block, if applicable).
2. State highway and local streets within and adjacent to the site, or the area to be served by the drainage improvements.
3. Major drainageways, facilities, and easements within and adjacent to the site.
4. Names of surrounding developments, land uses, and identification of present zoning.

B. Description of Property

1. Area in acres.
2. Existing ground cover (type of trees, shrubs, vegetation, general soil conditions, topography, and slope).
3. All drainageways.
4. Existing irrigation facilities such as ditches and canals.
5. Proposed land use and proposed ground cover.
6. General project description.
7. Identification of all wetland areas with total wetland acreages given.

II. DRAINAGE BASINS AND SUB-BASINS

A. Major Basin Description

1. Reference major drainageway planning studies (if any) such as flood hazard delineation reports, major drainageway planning reports, and flood insurance rate maps.
2. Describe major basin drainage characteristics, and existing and planned land uses within the basin, as defined by the Director of Community Development.
3. Identify all irrigation facilities within the basin that will influence or be influenced by the proposed site drainage.
4. Identify (include ownership) all lakes and ponds which either influence or may 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, as defined by the Director of Community Development. This may require delineation and mapping of off site drainage basins.

III. DRAINAGE DESIGN CRITERIA

A. Regulations

1. Describe the use of optional provisions and any deviation from these CRITERIA and justification for such actions.

B. Development Criteria Reference and Constraints

1. Describe previous drainage studies (e.g., project master plans, preliminary drainage reports, etc.) 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. Describe the effects of adjacent drainage studies.
3. Describe the drainage impact of site constraints such as streets, utilities, existing structures, and development on site plan.

C. Hydrologic Criteria

1. Identify design storm rainfall and its return period(s).
2. Identify runoff calculation method(s).
3. Identify detention discharge and storage calculation method(s).
4. Describe and justify other criteria or calculation methods used that are not presented in or referenced by the CRITERIA or MANUAL.

D. Hydraulic Criteria

1. Identify street capacity references.
2. Identify other capacity references, if applicable.
3. Identify detention outlet design method.
4. Identify check/drop criteria used, if applicable.
5. Describe other drainage facility design criteria used that are not presented in these CRITERIA or the MANUAL.

E. Stormwater Quality Criteria

1. Identify Best Management Practices 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 and porous pavement.
4. Describe other stormwater quality design criteria used that are not presented in these CRITERIA or the MANUAL.

IV. DRAINAGE FACILITY DESIGN

A. General Concept

1. Describe proposed drainage concept and how it fits existing drainage patterns.
2. Describe how offsite runoff will be considered and how expected impacts will be addressed.
3. Describe the content of tables, charts, figures, plates, or drawings presented in the report.

4. Describe the contents of referenced reports, studies, etc.
5. Describe proposed stormwater quality management strategy.

B. Specific Details

1. Describe drainage problems encountered and solutions proposed at specific design points.
2. Describe detention storage and outlet design requirements.
3. Describe maintenance and maintenance access as it relates to drainage and drainage structures.
4. Describe wetlands issues (if any), mitigation, replacement, etc.
5. Describe easements and tracts for drainage purposes, including the conditions and limitations for use.
6. Describe impacts of concentrating flow on downstream properties.
7. Describe stormwater quality Best Management Practices to be used.

C. Variances from CRITERIA and/or MANUAL

1. Identify provisions by section number for which a variance is requested.
2. Provide specific and detailed justification for each variance requested.

V. SUMMARY/CONCLUSIONS

A. Discussion of Compliance with Standards by Proposed Drainage Plan.

1. CRITERIA
2. Major Drainageway Planning Studies
3. MANUAL

B. Discussion of Final Drainage Concept

1. Effectiveness of drainage design to control damage from storm runoff.
2. Effectiveness of design to remove pollutants from storm runoff.

3. Influence of proposed development on the Major Drainageway Planning Studies recommendation(s), if any.

C. Include an engineer's certification that reads as follows:

"This report for the final drainage design of (Name of Development) was prepared by me (or under my direct supervision) in accordance with the provisions of Town of Elizabeth Storm Drainage Design and Technical Criteria, and was designed to comply with the provisions thereof. I understand that the Town of Elizabeth does not and will not assume liability for drainage facilities designed by others."

SIGNATURE: _____

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

D. Include a developer's certification that reads as follows:

"(Name of Developer) hereby affirms that the drainage facilities for (Name of Development) shall be constructed according to the design presented in this report and plan. I understand that the Town of Elizabeth does not and will not assume liability for drainage facilities designed and/or certified by my engineer. I understand that the Town of Elizabeth reviews drainage reports and plans but cannot, on behalf of (Name of Developer) and/or their successors and/or assigns, absolve same of future liability for improper design."

SIGNATURE: (Signature of Developer)

NAME: (Typed or Printed Name of Developer)

TITLE: (Official Title of Developer)

VI. REFERENCES

Reference all criteria and technical information used.

VII. APPENDICES

A. Hydrologic Computations*

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, if necessary for clarity.
5. Times of concentration and runoff coefficients for each basin.
6. Stormwater quality Best Management Practice sizing calculations, including runoff adjustments for minimizing directly-connected impervious areas.

B. Hydraulic Computations*

1. Culvert design calculations and capacities (existing and proposed).
2. Storm sewer design calculations and capacities, including energy grade line (EGL) and hydraulic grade line (HGL) elevations.
3. Gutter and street cross-section capacities as compared to allowable capacities based on allowable pavement encroachment.
4. Storm inlet capacities considering appropriate clogging factors at connection to storm sewer.
5. Open channel design.
6. Check and/or channel drop structure design.
7. Riprap design calculations.
8. Detention area/volume capacity and outlet capacity calculations for flood detention and water quality basins; depths of detention basins.
9. Wetland area and area/depth distribution for constructed wetland basins.
10. Infiltration rates and volumes for porous pavement or release rates where underdrains or infiltration are not possible.
11. Flow rates, velocities, longitudinal slopes and cross-sections for wetland channels and water quality swales.
12. Downstream/outfall system capacity to the Major Drainageway System.

* Include any input and output listings for any computer models used.

3.2 Final Report Drawing Contents

- (a) General Location Map: All drawings shall be 24" x 36" in size. A map shall be provided in sufficient detail to identify drainage flows entering and leaving the development and

general drainage patterns. The 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. The map shall identify all major construction (i.e., development, irrigation ditches, existing detention facilities, stormwater quality facilities, culverts, storm sewers, etc.) along the entire path of drainage. Basins, along with basin identification numbers, and divides shall be identified and topographic contours shall be included.

- (b) Floodplain Information: Flood plain limits (if any) shall be shown on all report drawings. The source and date of the flood plain limits shown (e.g., flood hazard area delineation, flood insurance rate map, etc.) shall be noted on the drawings.
- (c) Drainage Plan: Map(s) of the proposed development at a scale of 1" = 20' to 1" = 200' (or of sufficient scale to portray the drainage plan in adequate detail) on a 24" x 36" drawing shall be included. The plan shall show the following:
1. Existing (dashed lines) and proposed (solid lines) topographic contours at 2-foot maximum intervals. In areas of little relief, 1-foot contours shall be shown. In terrain where the slope exceeds 15%, the maximum interval is 5 feet. The contours shall extend a minimum of 100 feet beyond the property lines. Proposed contours shall match existing contours around the boundary of the proposed project.
 2. Existing and proposed vegetation.
 3. All existing wetland areas.
 4. Property lines, existing easements, and easements proposed for dedication, with purposes noted.
 5. Building outlines, square footage and first floor elevations of all existing and proposed structures.
 6. Streets, indicating ROW width, curb type, and sidewalk.
 7. Proposed type of street flow (i.e., vertical or combination curb and gutter), roadside ditch or swale, gutter, slope, flow direction, and cross pans.
 8. Existing drainage facilities and structures within map limits, including irrigation ditches, roadside ditches, cross pans, drainageways, storm sewers, swales, riprap, gutter flow directions, inlets, detention basins and culverts. Pertinent information, such as material, size, shape, slope, flow line elevations and location, shall also be included.
 9. Overall tributary drainage basin area boundary and drainage sub-basin boundaries. Label drainage sub-basins as shown in Table 1.

10. Proposed storm sewers and open drainageways, inlets, manholes, culverts, and other appurtenances, including riprap or other erosion protection. Show flow line elevations throughout the site and invert elevation(s) at system outfall(s).
11. Proposed structural water-quality Best Management Practices, their location, sizing, and design information.
12. 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. Show flow path leaving the development through the downstream properties ending at a major drainageway or receiving water.
13. Routing and accumulation of flows at various critical points for the initial storm runoff event, listed on the drawing using the format shown in Table 1.
14. Routing and accumulation of flows at various critical points for the major storm runoff events, listed on the drawing using the format shown in Table 1.
15. Volumes and release rates for detention storage facilities and water-quality capture volumes.
16. Detailed information on detention storage and water-quality facilities and their corresponding outlet structures.
17. 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, if applicable.
18. Location, and measured or estimated elevations, of all existing and proposed utilities affected by or affecting the drainage design.
19. Routing of upstream offsite drainage flow through the development.
20. Legend to define map symbols.
21. Project name, address, engineering firm and seal, and original and revision dates in title block in lower right hand corner.
22. North arrow, scale and available bench mark information and location for each bench mark.

4. CONSTRUCTION PLANS

For on-site drainage improvements, the final construction plans (24" x 36") shall be submitted after approval of the Final Drainage Report. Seven (7) 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 should be issued to the Town of Elizabeth. The construction plans, as a minimum and as appropriate, will include:

1. Plan and profile of proposed storm sewer installations, inlets, outlets and manholes with pertinent elevations, dimensions, type and horizontal control shown.
2. Culverts, end sections, and inlet/outlet protection with dimensions, type, elevations, and horizontal control indicated.
3. Other drainage-related structures and facilities (including underdrains and sump pump lines)..
4. Property and right-of-way lines, existing and proposed structures, fences and other land features.
5. Plan and profile of existing and proposed channels, ditches, swales, and on-site water quality Best Management Practices with construction details, cross-sections and erosion controls shown.
6. Detention and water quality (if separate) facility grading, trickle channels (if any), outlet and inlet locations, cross-sections or contours sufficient to verify volumes, etc..
7. Details of inlet and outlet control devices and of all structural components being constructed.
8. Maintenance access considerations and details.
9. General overlot grading and the erosion and sediment control plan prepared in accordance with applicable provisions of these CRITERIA and the MANUAL.
10. Landscaping and revegetation plans and details.
11. Proposed finish floor elevations of structures.
12. Relation of site to current and, if appropriate, modified floodplain boundaries.
13. Any and all wetland mitigation details.
14. 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 Colorado Water Quality Control Division specified in the stormwater discharge permit issued to the Town of Elizabeth.
15. Signature and seal of the Colorado professional engineer preparing these plans.

The information required for the plans shall be in accordance with sound engineering principles, these CRITERIA, and the TOWN requirements for subdivision designs. Construction documents

shall include geometric, dimensional, structural, foundation, bedding, hydraulic, landscaping, and other details as needed to construct the storm drainage facility. The accepted Final Drainage Report and Plan shall be included as part of the construction documents for all facilities affected by the drainage plan.

Approval by the Town of Elizabeth does not constitute an approval or the issuance of permits by the State of Colorado, 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 one that assumes the responsibility for the inspection if the design engineer is no longer available) shall provide the TOWN 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 the Town of Elizabeth. The engineer or developer shall also provide the TOWN with an as-built topographic survey for the project site at that time. The as-built topographic survey shall be provided in electronic format (AutoCAD Release 13 or 14) with a hard copy printout of the electronic file. Electronic elevation data (feature lines, break lines, reference points, etc.) shall be provided in a three-dimensional format via polylines and/or node coordinates. If the developer cannot provide the as-built topographic survey in the required three-dimensional format, the TOWN engineer will create the three-dimensional electronic data from two-dimensional data provided by the project engineer. The cost of converting the topographic information into three-dimensional electronic data shall be paid for by the developer. The developer or his representative should contact the TOWN engineer with any questions concerning the required as-built topographic survey electronic file format.

After receipt of the Certification of Inspection and as-built topographic survey, the TOWN engineer will schedule a site visit to insure that the drainage plan shown in the Final Drainage Report and construction drawings has been constructed according to the design. If serious discrepancies between the design and the as-built project are noted, the developer may be required to make corrections at his own expense prior to receiving a Certificate of Occupancy. Special circumstances (e.g. significant changes from the approved construction drawings) may require that as-built reproducible drawings of the drainage improvements also be provided.

The Certification of Inspection, as-built topographic survey, and as-built drawings (if required) must be provided to the TOWN prior to the issuance of a final sewer connection permit or the issuance of a Certificate of Occupancy.

6. PUBLIC DRAINAGE IMPROVEMENTS

If the project requires that drainage improvements be constructed that will be turned over to, and owned and maintained by the Town of Elizabeth, the following process must also be followed:

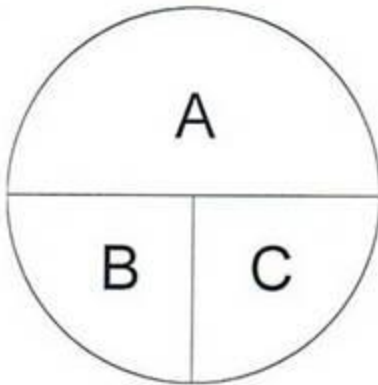
1. Three sets of plans (24" x 36") submitted for initial review.

2. An application to design, plan, construct, reconstruct or remodel a public improvement must be filed with the Director of Public Works.
3. A bond or letter of credit guaranteeing payment and performance must be executed prior to commencing with work on the project.
4. Upon completion of the project, a set of reproducible as-constructed plans, certified by a Colorado licensed engineer, must be submitted before the bond or other guarantee is released.
5. After approval of the initial review set, seven (7) sets of plans must be supplied which will be distributed by the Town 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 the MANUAL, these CRITERIA, and other applicable Town of Elizabeth ordinances, regulations, criteria or design guidelines. The plans may also be subject to review by outside agencies such as the Urban Drainage and Flood Control District, Federal Emergency Management Agency, U.S. Army Corps of Engineers, Environmental Protection Agency, Colorado Water Quality Control Division, or other agencies as required. The plans shall be signed and sealed by a Professional Engineer registered in the State of Colorado.

TABLE 1

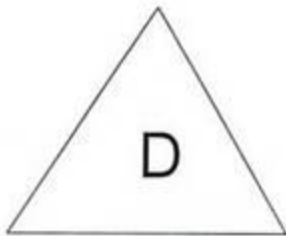
**BASIN SYMBOL AND SUMMARY RUNOFF TABLE
REQUIREMENTS**



A = BASIN DESIGNATION

B = AREA IN ACRES

**C = COMPOSITE RUNOFF
COEFFICIENT**



D = DESIGN POINT DESIGNATION

SUMMARY RUNOFF TABLE
(to be placed on drainage plan)

DESIGN POINT	CONTRIBUTING AREA (ACRES)	RUNOFF 5yr (CFS)	PEAK 100yr (CFS)
— XX	— XX.XX	— XX.X	— XX.X

STANDARD FORM SF-1

PRELIMINARY DRAINAGE REPORT SUBMITTAL CHECKLIST

SUBDIVISION: _____
 LOCATION: _____
 DATE SUBMITTED: _____
 SUBMITTED BY: _____
 CONTACT: _____
 PHONE: _____
 SUBMITTAL DATES: (1) _____ (2) _____ (3) _____ (4) _____
 DATE APPROVED: _____

ITEM	DESCRIPTION	RECEIVED OR NOT APPLICABLE	TO BE SUBMITTED
REPORT			
2.	Three (3) Copies, Clean and Legible	_____	_____
2.2	Typed, Bound, Numbered Pages, Folders/Pockets	_____	_____
	Professional Engineer's Stamp and Signature	_____	_____
2.2 I.	General Location and Description	_____	_____
2.2 I.A.	Location	_____	_____
2.2 I.B.	Description of Property	_____	_____
2.2 II.	Drainage Basins and Sub-Basins	_____	_____
2.2 II.A.	Major Basin Description	_____	_____
2.2 II.B.	Sub-Basin Description	_____	_____
2.2 III.	Drainage Facility Design	_____	_____
2.2 III.A.	General Concept	_____	_____
2.2 III.B.	Specific Details	_____	_____
2.2 III.C.	Variances from CRITERIA/MANUAL	_____	_____
2.2 IV.	Summary/Conclusions	_____	_____
2.2 IV.A.	Overall Summary, Conclusions, Opinions	_____	_____
2.2 IV.B.	Engineer's Certification	_____	_____
2.2 V.	References	_____	_____
PLAN (DRAWING)			
2.3(a)	General Location Map	_____	_____
2.3(b)	Flood Plain Information	_____	_____
2.3(c)	Drainage Plan Scale and Sheet Size	_____	_____
2.3(c)1.	Existing Contours	_____	_____
2.3(c)2.	Proposed Contours	_____	_____
2.3(c)3.	Existing Vegetation	_____	_____
2.3(c)4.	Existing Wetlands Areas	_____	_____
2.3(c)5.	Property Lines and Easements	_____	_____
2.3(c)6.	Building Outlines and First Floor Elevations	_____	_____
2.3(c)7.	Streets, ROWs, Sidewalks	_____	_____
2.3(c)8.	Existing Drainage Facilities and Structures	_____	_____
2.3(c)9.	Drainage Basin Boundaries and Sub-Boundaries	_____	_____
2.3(c)10.	Conceptual Major Drainage Facilities	_____	_____
2.3(c)11.	Flooding Limits	_____	_____
2.3(c)12.	Offsite Features that Influence Drainage	_____	_____
2.3(c)13.	Proposed Drainage Patterns, Flow Arrows	_____	_____
2.3(c)14.	Legend, Map Symbols	_____	_____
2.3(c)15.	Project Name, Address, Seal, Revision Dates	_____	_____
2.3(c)16.	North Arrow, Scale, Bench Mark Information	_____	_____

STANDARD FORM SF-2

FINAL DRAINAGE REPORT SUBMITTAL CHECKLIST

SUBDIVISION: _____
 LOCATION: _____
 DATE SUBMITTED: _____
 SUBMITTED BY: _____
 CONTACT: _____
 PHONE: _____
 SUBMITTAL DATES: (1) _____ (2) _____ (3) _____ (4) _____
 DATE APPROVED: _____

ITEM	DESCRIPTION	RECEIVED OR NOT APPLICABLE	TO BE SUBMITTED
REPORT			
3.	Three (3) Copies, Clean and Legible Typed, Bound, Numbered Pages, Folders/Pockets Professional Engineer's Stamp and Signature Self-Explanatory (Prelim. Report Not Needed)	_____ _____ _____ _____	_____ _____ _____ _____
3.1 I.	General Location and Description		
3.1 I.A.	Location	_____	_____
3.1 I.B.	Description of Property	_____	_____
3.1 II.	Drainage Basins and Sub-Basins		
3.1 II.A.	Major Basin Description	_____	_____
3.1 II.B.	Sub-Basin Description	_____	_____
3.1 III.	Drainage Design Criteria		
3.1 III.A.	Regulations	_____	_____
3.1 III.B.	Development Criteria Ref. and Constraints	_____	_____
3.1 III.C.	Hydrologic Criteria	_____	_____
3.1 III.D.	Hydraulic Criteria	_____	_____
3.1 III.E.	Stormwater Quality Criteria	_____	_____
3.1 IV.	Drainage Facility Design		
3.1 IV.A.	General Concept	_____	_____
3.1 IV.B.	Specific Details	_____	_____
3.1 IV.C.	Variances from CRITERIA/MANUAL	_____	_____
3.1 V.	Summary/Conclusions		
3.1 V.A.	Compliance with Standards	_____	_____
3.1 V.B.	Final Drainage Concept	_____	_____
3.1 V.C.	Engineer's Certification	_____	_____
3.1 V.D.	Developer's Certification	_____	_____
3.1 VI.	References	_____	_____
3.1 VII.	Appendices		
3.1 VII.A.	Hydrologic Computations	_____	_____
3.1 VII.B.	Hydraulic Computations	_____	_____
		_____	_____
		_____	_____
		_____	_____
		_____	_____

STANDARD FORM SF-2 (Continued) **FINAL DRAINAGE REPORT SUBMITTAL CHECKLIST**

SUBDIVISION: _____
 LOCATION: _____

ITEM	DESCRIPTION	RECEIVED OR NOT APPLICABLE	TO BE SUBMITTED
PLAN (DRAWING)			
3.2(a)	General Location Map	_____	_____
3.2(b)	Flood Plain Information	_____	_____
3.2(c)	Drainage Plan Scale and Sheet Size	_____	_____
3.2(c)1.	Existing Contours	_____	_____
3.2(c)1.	Proposed Contours	_____	_____
3.2(c)2.	Existing and Proposed Vegetation	_____	_____
3.2(c)3.	Existing Wetlands Areas	_____	_____
3.2(c)4.	Property Lines and Easements	_____	_____
3.2(c)5.	Building Outlines and First Floor Elevations	_____	_____
3.2(c)6.	Streets, ROWs, Curb Type, Sidewalks	_____	_____
3.2(c)7.	Proposed Street Flow	_____	_____
3.2(c)8.	Existing Drainage Facilities and Structures	_____	_____
3.2(c)9.	Drainage Basin Boundaries and Sub-Boundaries	_____	_____
3.2(c)10.	Proposed Storm Sewers	_____	_____
3.2(c)11.	Proposed Structural Water-Quality BMPs	_____	_____
3.2(c)12.	Outfall Point/Downstream Conveyance	_____	_____
3.2(c)13.	Initial Storm Runoff, Table 1 Format	_____	_____
3.2(c)14.	Major Storm Runoff, Table 1 Format	_____	_____
3.2(c)15.	Detention/Water-Quality Volumes	_____	_____
3.2(c)16.	Detention Storage/Water-Quality Facility Information	_____	_____
3.2(c)17.	Floodplains	_____	_____
3.2(c)18.	Locations and Elevations of Affected Utilities	_____	_____
3.2(c)19.	Offsite Drainage Flow Routing Through Project	_____	_____
3.2(c)20.	Legend/Map Symbols	_____	_____
3.2(c)21.	Project Name, Address, Seal, Revision Dates	_____	_____
3.2(c)22.	North Arrow, Scale, Bench Mark Information	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

ADDITIONAL REVIEW NOTES: