

CHAPTER 2 - SUBMITTAL REQUIREMENTS

CRITERIA

- A. Regulations: Discussion of the optional provisions selected or the deviation from the CRITERIA, if any, and its justification.
- B. Development Criteria Reference and Constraints
 - 1. Discussion of previous drainage studies (i.e., project master plans) for the site in question that influence or are influenced by the drainage design and how the plan will affect drainage design for the site.
 - 2. Discussion of the effects of adjacent drainage studies.
 - 3. Discussion of the drainage impact of site constraints such as streets, utilities, light rail rapid transit, existing structures, and development or site plan.
- C. Hydrological Criteria
 - 1. Identify design rainfall
 - 2. Identify runoff calculation method
 - 3. Identify detention discharge and storage calculation method.
 - 4. Identify design storm recurrence intervals.
 - 5. Discussion and justification of other criteria or calculation methods used that are not in or referenced by the CRITERIA.
- D. Hydraulic Criteria
 - 1. Identify various capacity reference.
 - 2. Discussion of other drainage facility design criteria used that are not presented in the CRITERIA.
- E. Variances from Criteria
 - 1. Identify provisions by section number for which a variance is requested.
 - 2. Provide justification for each variance requested.

DISCUSSION

Existing

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, existing and planned land uses within the basin.
3. Identification of all nearby irrigation facilities within 100 feet of the property boundary, which will influence or be influenced by the local drainage.

B. Sub-Basin Description

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

Proposed

DRAINAGE FACILITY DESIGN

A. General Concept

1. Discussion of concept and typical drainage patterns
2. Discussion of compliance with offsite runoff considerations.
3. Discussion of the content of tables, charts, figures, plates, or drawings presented in the report.
4. Discussion of anticipated and proposed drainage patterns.
5. Discussion of the calculated flow magnitudes at critical design points as shown and cross-referenced on the associated Main Drainage Map.

B. Specific Details

1. Discussion of drainage problems encountered and solutions at specific design points.
2. Discussion of detention storage and outlet design.
3. Discussion of water quality enhancement design (if required).
4. Discussion of maintenance access and aspects of the design.
5. Discussion of easements and tracts for drainage and their purposes, including the conditions and limitations for use.

VI CONCLUSION

A. Compliance with standards:

1. "CRITERIA"
2. "Major Drainageway Planning Studies"

B. Drainage Concept

1. Discussion of anticipated impact of the major storm on both the upstream and downstream side of the property after implementation of the proposed drainage improvements.
2. Effectiveness of drainage design to control damage from storm runoff.
3. Influence of proposed development on the Major Drainageway Planning Studies recommendations(s).
4. Reference and discussion of proposed erosion control procedures.
5. General Comments

The report shall commence with the following certification:

"I hereby certify that this report (plan) for the _____ Drainage design of Name of Development was prepared by me (or under my direct supervision) in accordance with the provisions for the Town of Bennett Storm Drainage Criteria Manual for the owners thereof. I understand that Bennett does not and will not assume liability for drainage facilities designed by others."

Registered Professional Engineer
State of Colorado No. _____
Affix Seal

This section of the report shall subsequently be concluded with a Reference and/or Bibliography page.

APPENDIX SECTION

The appendix section of the report shall consist of the following chapters and contents:

OVERALL HISTORIC DRAINAGE BASIN MAP/VICINITY MAP

A map shall be provided in sufficient detail to identify drainage flows entering and leaving the development and general drainage patterns. The map should be at a scale of 1" = 1,000' to 1" = 4,000', and show the path of all drainage from the upper end of any offsite basins to the defined major drainageways.

The map shall identify any major construction (i.e., development, irrigation ditches, existing detention facilities, culverts, storm sewers) along the entire path of drainage. Basins and divides are to be identified and topographic contours are to be included.

The subject property shall be clearly delineated on this map. For some developments it is recommended to prepare a separate "Overall Historic Drainage Basin map" in a 24" x 36" format, to be inserted within the back pocket, together with the regular "Drainage Map".

SOILS MAP

1. A copy of the SCS (when available) soils map of the area showing the subject site and a reference list of the soils groups within the proposed development.
2. Associated descriptions of each soils type.

100-YEAR FLOOD PLAIN

1. If available, a copy of the FEMA flood plain boundary source map (include panel number), with the location of the subject property clearly marked.

OFF-SITE BASIN ANALYSIS

1. If the subject property is impacted directly by (a) major off-site basin(s), a full analysis of the magnitude of these flows shall be included within the report.

ON-SITE BASIN ANALYSIS

1. This section of the report shall commence with the standard forms and graphs used in the subsequent calculation section.
2. The calculation section shall be on the standard forms required by the Town.
3. Where applicable, the on-site and off-site computations shall include, but not be limited to:
 - 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.
 5. Time of concentration and runoff coefficients for each basin.
 - B. Hydraulic Computations
 1. Open channel design.
 2. Check and/or channel drop design.
 3. Detention area/volume capacity and outlet capacity calculations. Depths of detention basins.
 4. Downstream/outfall system capacity to the Major Drainageway System.

DETENTION

1. A step-by-step analysis shall be provided of the 10-year and 100-year required detention volumes and allowable release rates for the subject area.
2. Storage capacity analysis for both the 10-year and 100-year storm.
3. Detailed analysis and design of the associated drainage control structures.

EROSION CONTROL

All Phase II reports shall conclude with a standard erosion control procedures section. The standard outline provided within the Criteria Manual will be acceptable in most cases. Expanded and more detailed versions, in addition to an erosion control plan, may be required by the Town. The Appendix Section shall conclude with one (or more) Drainage Map(s) within a back pocket of the report.

DRAINAGE MAP (within the back of the report)

Maps of the proposed development at a scale of 1" = 20' to 1" = 200' on a 24" x 36" drawing shall be included. The plan shall show the following:

1. North arrow and scale.
2. Overall historic drainage basin map/vicinity map shall be provided in sufficient detail to identify drainage flows entering and leaving the development and general drainage patterns. The map should be at a scale of 1" = 1000' 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 any major construction (i.e., development, irrigation ditches, existing detention facilities, culverts, storm sewers) along the entire path of drainage. Basins and divides are to be identified and topographic contours are to be included. The subject property shall be clearly delineated on this map. For some developments it is recommended to prepare a separate "Overall Historic Drainage Basin Map" in a 24" x 36" format, to be inserted within the back pocket, together with the regular "Drainage Map".
3. Existing and proposed contours at 1 foot maximum intervals. The contours shall extend a minimum of 100 feet beyond the property lines.
4. Property lines and easements with purposes noted.
5. Streets, indicating ROW width, flowline width, curb type sidewalk and approximate slopes.
6. Existing drainage facilities and structures, including irrigation ditches, roadside ditches, crosspans, drainageways, gutter flow directions, and culverts. All pertinent information such as material, size, shape, slope, and location shall also be included.
7. Overall drainage area boundary and drainage sub-area boundaries.
8. Identification of all sub-basin areas and their associated acreage.
9. Identification of all point(s) of beginning and design points.
10. Historical and developed peak flows for each pertaining design point.
11. Historical and developed peak flows within critical road and/or swale sections.
12. A series of small surface flow arrows delineating the overall flow pattern.

13. Proposed type of street flow (i.e., vertical or combination curb and gutter), roadside ditch, gutter, slope and flow directions, and cross pans.
14. Proposed storm sewers and open drainageways, including inlets manholes, culverts, and other appurtenances, including riprap protection.
15. Proposed outfall point for runoff from the developed area and facilities to convey flows to the final outfall point without damage to downstream properties.
16. Volumes and release rates for detention storage facilities.
17. Location and elevations of all existing floodplains affecting the property.
18. Location and (if known) elevations of all existing and proposed utilities affected by or affecting the drainage design.
19. Routing of off-site drainage flow through the development.
20. Definition of flow path leaving the development through the downstream properties ending at a major drainageway.
21. The limit of the 100-year ponding elevation within designated detention areas.
22. A general plan for landscaping.
23. The location of all existing trees with a diameter of 4 inches or more.
24. Legend to define map symbols.
25. Title block in lower right-hand corner.

Upon approval of the report, a signed copy will be returned to the applicant.

2.4 FINAL (PHASE III) DRAINAGE REPORT

A Final Drainage Report must be submitted with all final plat or final construction and development plan approval applications. Due to their great requirement similarities, most developers prefer to submit Final (Phase III) Reports and final construction and development plans without going through a preliminary plan and report approval phase.

The Phase III Drainage Report will review in great detail the proposed drainage concept for the subject property.

All reports shall be typed on 8 1/2" x 11" paper and bound. The drawings, figures, plates, and tables shall be bound with the report or included in a pocket within the back of the report.

The report shall include a cover letter presenting the final design for review and shall be prepared by or supervised by an engineer licensed in Colorado, unless the Town specifically grants, in writing, exemption from this requirement. The report shall in general conform to the sample report outline provided within the "Report Format Outline" section of this Manual and have the following contents:

TYPE OF REPORT

FINAL (PHASE III)

To be submitted with the application for the final plat or the final construction and development plan approval application.

TYPE OF REPORT: FINAL (PHASE III)

REPORT SECTION

Date

I. INTRODUCTION

Type of report, Owner's name, preparer's name, development name.

II. LOCATION

- A.
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
 3. Major drainageways and facilities
 4. Names of surrounding developments and/or owners

B. Description of Property

1. Area in acres
2. Ground cover (type of ground cover and vegetation)
3. On-site surface soil(s) type(s)
4. Major drainageways
5. Existing major irrigation facilities such as ditches and canals
6. Proposed land use

III. INTENT

- A.
 - 1. The purpose of the study
 - 2. Identification of map and information sources
 - 3. General design concept

IV. CRITERIA

- A. Regulations: Discussion of the optional provisions selected or the deviation from the CRITERIA, if any, and its justification.
- B. Development Criteria Reference and Constraints
 - 1. Discussion of previous drainage studies (i.e., project master plans) for the site in question that influence or are influenced by the drainage design and how the plan will affect drainage design for the site.
 - 2. Discussion of the effects of adjacent drainage studies.
 - 3. Discussion of the drainage impact of site constraints such as streets, utilities, light rail rapid transit, existing structures, and development or site plan.
- C. Hydrological Criteria
 - 1. Identify design rainfall
 - 2. Identify runoff calculation method
 - 3. Identify detention discharge and storage calculation method.
 - 4. Identify design storm recurrence intervals.
 - 5. Discussion and justification of other criteria or calculation methods used that are not in or referenced by the CRITERIA.
- D. Hydraulic Criteria
 - 1. Identify various capacity reference.
 - 2. Discussion of other drainage facility design criteria used that are not presented in the CRITERIA.
- E. Variances from Criteria
 - 1. Identify provisions by section number for which a variance is requested.
 - 2. Provide justification for each variance requested.

V. DISCUSSION

Existing

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, existing and planned land uses within the basin.
3. Identification of all nearby irrigation facilities within 100 feet of the property boundary, which will influence or be influenced by the local drainage.

B. Sub-Basin Description

1. Discussion of historic drainage patterns of the property in question.
2. Discussion of off-site drainage flow patterns and impact on development under existing and fully developed basin conditions.

Proposed

DRAINAGE FACILITY DESIGN

A. General Concept

1. Discussion of concept and typical drainage patterns
2. Discussion of compliance with off-site runoff considerations.
3. Discussion of the content of tables, charts, figures, plates, or drawings presented in the report.
4. Discussion of anticipated and proposed drainage patterns.
5. Discussion of the calculated flow magnitudes at critical design points as shown and cross-referenced on the associated Main Drainage Map.

B. Specific Details

1. Discussion of drainage problems encountered and solutions at specific design points.
2. Discussion of detention storage and outlet design.
3. Discussion of water quality enhancement design (if required).

4. Discussion of maintenance access and aspects of the design.
5. Discussion of easements and tracts for drainage purposes, including the conditions and limitations for use.

VI. CONCLUSION

A. Compliance with Standards

1. "CRITERIA"
2. "Major Drainageway Planning Studies"

B. Drainage Concept

1. Discussion of anticipated impact of the major storm on both the upstream and downstream side of the property after implementation of the proposed drainage improvements
2. Effectiveness of drainage design to control damage from storm runoff.
3. Influence of proposed development on the Major Drainageway Planning Studies recommendation(s).
4. Reference and discussion of proposed erosion control procedures.
5. General Comments

The report shall commence with the following certification:

" I hereby certify that this report (plan) for the _____ Drainage design of (Name of Development) was prepared by me (or under my direct supervision) in accordance with the provisions of the Town of Bennett Storm Drainage Criteria Manual for the owners thereof. I understand that Bennett does not and will not assume liability for drainage facilities designed by others"

Registered Professional Engineer
State of Colorado No. _____
Affix Seal

On a separate page the following Owner signed and dated statement shall be enclosed:

"(Name of Developer) hereby certifies that the drainage facilities for (Name of Development) shall be constructed according to the design presented in this report. I understand that the Town of Bennett does not and will not assume liability for the drainage facilities designed and/or certified by my engineer. I understand that the Town of Bennett reviews drainage plans pursuant to Colorado Revised Statutes Title 30, Article 28, but cannot, on behalf of (Name of Development), guarantee that final drainage design review will absolve (Name of Developer) and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the Final Plat and/or Final Development Plan does not imply approval of my engineer's drainage design."

Name of Developer Date

Authorized Signature

This section of the report shall subsequently be constructed with a Reference and/or Bibliography page.

APPENDIX SECTION

The Appendix Section of the report shall consist of the following chapters and contents.

OVERALL HISTORIC DRAINAGE BASIN MAP/VICINITY MAP

A map shall be provided in sufficient detail to identify drainage flows entering and leaving the development and general drainage patterns. The map should be at a scale of 1" = 1,000' to 1" = 4,000' and show the path of all drainage from the upper end of any off-site basins to the defined major drainageways.

The map shall identify any major construction (i.e., development, irrigation ditches, existing detention facilities, culverts, storm sewers) along the entire path of drainage. Basins and divides are to be identified and topographic contours are to be included.

The subject property shall be clearly delineated on this map. For some developments it is recommended to prepare a separate "Overall Historic Drainage Basin Map" in a 24" x 36" format, to be inserted within the back pocket, together with the regular "Drainage Map".

SOILS MAP

1. A copy of the SCS (when available) soil map of the area showing the subject site and a reference list of the soils groups within the proposed development.
2. Associated descriptions of each soils type.

100-YEAR FLOOD PLAIN

1. If available, a copy of the FEMA flood plain boundary source map (including panel number); with the location of the subject property clearly marked.

OFF-SITE BASIN ANALYSIS

1. If the subject property is impacted directly by a major off-site basin(s), a full analysis of the magnitude of these flows shall be included within the report.

ON-SITE BASIN ANALYSIS

1. This section of the report shall commence with the standard forms and graphs used in the subsequent calculation section.

2. The calculation section shall be on the standard forms required by the Town.
3. Where applicable the on-site and off-site computations shall include, but not be limited to:
 - A. Hydrologic Computations
 - i. Land use assumptions regarding adjacent properties
 - ii. Initial and major storm runoff at specific design points
 - iii. Historic and fully developed runoff computations at specific design points
 - iv. Hydrographs at critical design points
 - v. Time of concentration and runoff coefficients for each basin
 - B. Hydraulic Computations
 - i. Culvert Capacities
 - ii. Storm sewer capacity, including energy grade line (EGL) and hydraulic grade line (HGL) elevations
 - iii. Gutter capacity as compared to allowable using Figures 203 and 204
 - iv. Storm inlet capacity including inlet control rating at connection to storm sewer.
 - v. Open channel design
 - vi. Check and/or channel drop design
 - vii. Detention area/volume capacity and outlet capacity calculations. Depths of detention basins
 - viii. Downstream/outfall system capacity to the Major Drainageway System
4. The calculation section shall conclude with appropriate section analysis and structure design.

DETENTION

1. A step-by-step analysis shall be provided of the 10-year and 100-year required detention volumes and allowable release rates
2. Storage capacity analysis for both the 10-year and 100-year storm
3. Detailed analysis and design of the associated drainage control structures

EROSION CONTROL

1. All phase III reports shall conclude with a standard erosion control procedures section.

2. The standard outline provided within the criteria manual will be acceptable in most cases.
3. Expanded and more detailed versions, in addition to an erosion control plan, may be required by the Town.
4. The Appendix Section shall conclude with one (or more) drainage maps within a back pocket of the report.

DRAINAGE MAP (Within the back of the report)

Maps of the proposed development at a scale of 1" = 20' to 1" = 200' on a 24" x 36" drawing shall be included. The plan shall show the following:

1. North arrow and scale
2. Overall Historic Drainage Basin Map/Vicinity Map
The map shall be provided in sufficient detail to identify drainage flows entering and leaving the development and general drainage patterns. The map should be at a scale of 1" = 1000' to 1" = 4000' and show the path of all drainage from the upper end of any off-site basins to the defined major drainageways.
The map shall identify any major construction (i.e., development, irrigation ditches, existing detention facilities, culverts, storm sewers) along the entire path of drainage. Basins and divides are to be identified and topographic contours are to be included.
The subject property shall be clearly delineated on this map. For some developments it is recommended to prepare a separate Overall Historic Drainage Basin Map in a 24" x 36" format, to be inserted within the back pocket, together with the regular Drainage Map.
3. Existing and proposed contours at 1-foot maximum intervals. The contours shall extend a minimum of 100 feet beyond the property lines
4. Property lines and easements with purposes noted.
5. Streets indicating ROW width, flowline width, curb type, sidewalk, and approximate slopes.
6. Existing drainage facilities and structures, including irrigation ditches, roadside ditches, crosspans, drainageways, gutter flow directions, and culverts. All pertinent information such as material, size, shape, slope, and location shall also be included
7. Overall drainage area boundary and drainage sub-area boundaries..

8. Identification of all sub-basin areas and their associated acreage.
9. Identification of all point(s) of beginning and design points.
10. Historical and developed peak flows for each pertaining design point.
11. Historical and developed peak flows within critical road and/or swale sections.
12. A series of small surface flow arrows delineating the overall flow pattern.
13. Proposed type of street flow (i.e., vertical or combination curb and gutter), roadside ditch, gutter, slope and flow directions, and cross pans.
14. Proposed storm sewers and open drainageways, including inlets, manholes, culverts, and other appurtenances, including riprap protection.
15. Proposed outfall point for runoff from the developed area and facilities to convey flows to the final outfall point without damage to downstream properties.
16. Volumes and release rates for detention storage facilities and information on outlet works.
17. Location and elevations of all existing floodplains affecting the property.
18. Location and (if known) elevations of all existing and proposed utilities affected by or affecting the drainage design.
19. Routing of off-site drainage flow through the development.
20. Definition of flow path leaving the development through the downstream properties ending at a major drainageway.
21. Reproductions (slightly reduced if necessary), of as many as reasonably possible of the critical sections and control structures analyzed and designed within the report.
22. The limit of the 100-year ponding elevations within designated detention areas.
23. A general plan for landscaping.
24. The location of all existing trees with a diameter of 4 inches or more.
25. Legend to define map symbols.
26. Title block in lower right hand corner.

Upon approval of the report a signed copy will be returned to the applicant.

CONSTRUCTION PLANS

Where drainage improvements are to be constructed, final construction plans (on 24" by 36" mylar) shall be submitted with the Final Drainage Report. Final construction plans must be submitted at least four weeks prior to issuance of construction permits for the public improvements covered by the plans. Approval of the final construction plans by the Town Engineering Representative is a condition of issuing the construction permits. Mylar reproducibles of the approved Final Drainage Plan shall be submitted to the Town for signature. The Town will retain one mylar for its records. The plans for the drainage improvements will include:

1. Detailed designs of all flow control structures.
2. Storm sewers, inlets, outlets and manholes with pertinent elevations, dimensions, type, and horizontal control indicated.
3. Culverts, end sections, and inlet/outlet protection with dimensions, type, elevations, and horizontal control indicated.
4. Channels, ditches, and swales (including side/rear yard swales) with lengths, widths, cross-sections, and erosion control (i.e. riprap, concrete, grout) indicated.
5. Checks, channel drops, erosion control facilities.
6. Detention pond grading, trickle channels, outlets, and landscaping.
7. Other drainage related structures and facilities (including underdrains and sump pump lines).
8. Maintenance access considerations.
9. Overlot grading and erosion and sedimentation control plan.

The information required for the plans shall be in accordance with sound engineering principles, these CRITERIA and the County 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 approved Final Drainage Plan shall be included as part of the construction documents for all facilities affected by the drainage plan.

The Town may require that construction plans be signed by a registered professional engineer as being in accordance with the Town approved drainage report/drawings.

RECORD DRAWINGS AND FINAL ACCEPTANCE CERTIFICATE

Record drawings for all improvements are to be submitted to the Town with a request for acceptance. Certification of the record drawings may be required as follows:

1. Registered Land Surveyor: A land surveyor registered in the State of Colorado shall certify the as-built detention pond volumes and surface areas at the design depths, outlet structure sizes and elevations, storm sewer sizes and invert elevations at inlets, manholes, and discharge location, and representative open channel cross-sections, and dimensions of all the drainage structures.
2. Registered Professional Engineer: The responsible design engineer shall state that "to the best of my knowledge, belief, and opinion, the drainage facilities were constructed in accordance with the design intent of the approved drainage report and construction drawings."

One set of certified record drawings shall be submitted as mylars. The Town will retain this set for their records.

The Town Engineering representative will compare the certified record drawing information with the construction drawings. A certificate of Acceptance will be issued only if:

1. The record drawing information demonstrates that the construction is in compliance with the design intent.
2. The record drawings are certified by both a registered land surveyor and the responsible design engineer. (unless exempted in writing)

A summary of the required certifications and approvals is presented in the following:

| <u>ITEM</u> | <u>CERTIFICATION REQUIRED (EXCEPT WRITTEN EXEMPTION)</u> | <u>TOWN APPROVAL REQUIRED</u> |
|--|--|------------------------------------|
| General Report | Engineer |Yes |
| Preliminary Report | Engineer | Yes |
| Final Report | Engineer Developer | Yes |
| Construction Drawings | Engineer | Yes |
| Record Drawings | Engineer Land Surveyor | Yes (Acceptance Certificate) |
| Floodplain Modification or Revision Study | Engineer | Yes |

2.6 REQUIREMENTS FOR A FLOODPLAIN MODIFICATION OR REVISION STUDY

The modification or revision of a floodplain that is delineated in a drainage master plan Flood Hazard Area Delineation report (FHAD) or the FEMA Flood Insurance Rate Map (FIRM) will require a Floodplain Modification or Revision Study. The study is required to ensure that property being developed is actually removed from the floodplain, that other properties that share frontage along the floodplain will not be adversely impacted, that the channel alignment will be stable and will not be subject to erosion which may threaten property, that sufficient conveyance capacity is maintained in the drainageway, and that the Town of Bennett complies with the requirements of the DISTRICT and FEMA for administering the floodplain management program. A Floodplain Modification or Revision Study shall also be required in designating a floodplain for drainageways where one has not been established.

A Floodplain Modification or Revision Study may range in scale from a drainage master plan report to a brief report for a single subdivision which consists of placing fill up to the established 0.5 foot floodway. The effort necessary for a floodplain modification study is dependent upon the amount of information previously generated, the potential for impact on adjacent properties, the magnitude of flow in the channel, the size of the area affected, the need for channel stabilization, and the sediment transport and fluvial morphological aspects of the stream.

A Floodplain Modification or Revision Study approved by Adams County is required by the Town of Bennett for an activity which will result in the modification of a floodplain that was delineated in a drainage master plan, FHAD or the FEMA, FIRM. Floodplain Modification or Revision Studies.

GENERAL SUBMITTAL REQUIREMENTS BY CONSTRUCTION TYPE

NEW RESIDENTIAL CONSTRUCTION

EXISTING PLATTED LOT

INTRODUCTION

This section is designed for infill lots within the existing town limits. Its purpose is to provide for uniformity with the overall drainage pattern for the town, to minimize the effects of construction on neighboring residences and to maintain historic flow patterns in the neighborhood.

SITE PLAN

Prior to approval for construction, the developer will submit to the town for review and approval, a site plan which shows the location of lot lines, the location of the proposed structure, the location of the proposed driveway and the general topographic configuration of the lot. A second drawing will be submitted which shows the proposed pattern of drainage from not only the lot, but from adjacent lots. This information will be of sufficient accuracy to demonstrate that excess outside flows onto the lot will not impair the suitability of the proposed dwelling and secondly, that the new flow patterns will not be directed onto adjacent properties in a manner that will impair those properties. Flows from paved areas or roofs will be directed to existing roadway ditches or onto existing drainage easements. If the location of the proposed dwelling blocks a natural drainage, it will be the developers responsibility to redirect the flows.

DRIVEWAYS AND ENTRANCES

Driveways and other permanent structures which will reduce the design capacity of the drainage ditches or those which divert the flow across the roadways will not be allowed. Unless otherwise indicated, minimum culvert sizes will be based on 10-year peak flows but shall not be less than 18 inches in diameter. Culverts will be placed in such a manner so as to ensure that they conform with the established or adopted slopes along the roadways. Cross pan driveways are generally not acceptable. All culverts shall be corrugated iron or reinforced concrete pipe and shall extend a minimum of five feet beyond the proposed driveway.

CONSTRUCTION CONTROL

During construction of the dwelling and the grading of the lot, it will be mandatory that certain measures be taken to minimize the adverse effects on neighboring residences. Initial site grading will be done in such a manner that the pattern of drainage across the property, either in the historic direction or in the approved direction, is maintained.

Drainage channels shall be kept operational during the course of construction. If over twenty-five percent of the vegetation on the building lot is removed, the builder must comply with the erosion control requirements listed below. If the construction on the lot causes any of the drainage ways or roadside ditches to fill with sediment, the builder shall immediately reconstruct the ditches to the pre-construction contours and open any culverts which have been plugged. All areas of piled dirt shall be wetted periodically to minimize blowing of dirt. Entrance and egress from the lot shall be by way of the approved driveway except for delivery and removal of construction materials.

EROSION CONTROL

Applicable erosion control measures shall be addressed in a later chapter of these Criteria. All erosion control requirements shall be adhered to by those to whom they apply.

POST-CONSTRUCTION MAINTENANCE

After construction, the owner will reseed all disturbed areas and maintain all new drainages in such a manner as to minimize erosion and excessive runoff. The owner will also maintain the culvert below the driveway in such a way as to allow all planned flows to pass without impairment. Should the owner fail to maintain the culvert and therefore allow flows to either divert around the culvert or across the street, the Town will replace the culvert and the homeowner shall be billed for materials and service.

NEW SUBDIVISION - RESIDENTIAL USE

The developer shall submit to the Town Planning Commission a complete drainage report which will specify the amount of storm flows which will be released from the site, location of the discharge, ponding size and location, and any impacts that these flows will have on the downstream residents. All discharges are to be made into an existing drainage way, to public roads and streets or to an approved drainage easement.

Easements are not to be used unless no other discharge point is available and, the developer is responsible for any costs incurred in modifying the easement in order to carry flows without impact on adjacent properties.

DRIVEWAYS AND ENTRANCES

Driveways and other permanent structures which will reduce the design capacity of the drainage ditches or those which divert the flow across the roadways will not be allowed. Unless otherwise indicated, minimum culvert sizes will be based on 10-year peak flows but shall not be less than 18 inches in diameter. Culverts will be placed in such a manner so as to ensure that they conform with the established or adopted slopes along the roadways. Cross pan driveways are generally not acceptable. All culverts shall be corrugated iron or reinforced concrete pipe and shall extend a minimum of five feet beyond the proposed driveway.

BUILDING SITE REQUIREMENTS

The developer shall present sufficient documentation to allow the town to determine whether the proposed building site will impact any existing drainage control easements or drainage ways. No construction will be allowed which reduces the capacity of existing facilities. All new building lots shall contain drainage easements on the perimeter unless a natural drainage way occurs through the property, in which case the drainage way can be dedicated as an easement. Any drainage ways which are constructed as a portion of the development's shall be dedicated to the Town after adequate information is received regarding the extent of maintenance required and its suitability for the long range plans of the Town. Any improvements which the Town will not accept shall be removed and replaced with a suitable alternative.

CONSTRUCTION CONTROL

During construction of the dwelling and the grading of the lot, it will be mandatory that certain measures be taken to minimize the adverse effects on neighboring residences. Initial site grading will be done in such a manner that the pattern of drainage across the property, either in the historic direction or in the approved direction, is maintained. Drainage channels shall be kept operational during the course of construction. If the construction on the lot causes any of the drainage ways or roadside ditches to fill with sediment, the builder shall immediately reconstruct the ditches to the pre-construction contours and open any culverts which have been plugged.

All areas of piled dirt shall be wetted periodically to minimize blowing of dirt. Entrance and egress from the lot shall be by way of the approved access roads. Trash and litter shall be contained and removed from the site following construction.

EROSION CONTROL DURING CONSTRUCTION

The developer is responsible for the control of runoff and sediment which exits the construction site. Erosion and sediment control is mandatory. The acceptable techniques are to provide a sediment trap, silt basin, erosion bales or other approved methods which are proved to eliminate sediment discharges. If during construction the methods are shown not to work, the developer will, within 7 days, replace the non-functioning portion with a modified system and respond to the Town with the new method. Any damages to property owners will be the responsibility of the developer. Within 30 days of the completion of construction, the developer shall reseed all disturbed areas with natural vegetation. A revegetation plan shall be submitted with the drainage report and shall demonstrate estimated completion times for the phases of the project and when specific areas will be revegetated. Erosion and sediment devices shall be left in place and maintained until the vegetation has reached an adequate density to take over the erosion and sediment control. On new developments in excess of 10 acres the Town may require a bond equal to \$500 per lot or \$1,000 per acre to ensure completion of erosion and sediment control measures. Should the developer fail to construct adequate control facilities, the Town will use the bond for construction of these facilities. When construction and revegetation have been completed to the satisfaction of the Town, the remaining monies in the bond, with any interest which has accumulated, shall be returned to the developer. Should the monies in the bond not be sufficient to cover the expenses of the Town, the Town shall withhold occupancy permits for the entire project until reimbursed for the extra amount.

EROSION CONTROL

Full erosion control measures shall be addressed and subsequently implemented in full compliance with the pertaining chapter of these Criteria.

POST CONSTRUCTION MAINTENANCE

After construction, the owner will reseed all disturbed areas and maintain all new drainages in such a manner as to minimize erosion and excessive runoff. The owner will also maintain the culvert below the driveway in such a way as to allow all planned flows to pass without impairment.

Should the owner fail to maintain the culvert and therefore allow flows to either divert around the culvert or across the street, the Town will replace the culvert and the homeowner shall be billed for materials and services.

COMMERCIAL CONSTRUCTION - PREVIOUSLY PLATTED LOT

The developer shall, within the framework of the previous plat, construct such drainage improvements as are necessary to control onsite flows without impact to other properties. The developer shall submit a drainage report which indicates the magnitude of flows and the discharge location. Where possible, onsite detention of the excess flows above historic levels shall be made. The location of the structure and parking areas shall not impact existing drainage ways and shall not restrict flows through the property and with the public right-of-way. At entrances to the facility, the developer shall install a minimum culvert size of 18 inches unless the calculated peak flows require a larger size. No driveway shall be allowed which diverts the street flows into the center of the road or to the opposite side of the road. No drainage flows shall discharge onto adjacent properties in quantities in excess of historic levels. All swales and diversions shall be constructed for minimal maintenance and it shall be the responsibility of the developer or owner to maintain and repair such structures.

EROSION CONTROL

Full erosion control measures shall be addressed and subsequently implemented in full compliance with the pertaining chapter of these Criteria.

COMMERCIAL CONSTRUCTION - NEW PLAT

The developer must submit to the Town Planning Commission a complete drainage report showing the magnitude of storm water flows, location of discharges, ponding size and location and full erosion and sedimentation control measures. This report shall be as complete as possible and shall meet all criteria described within this manual. commercial construction causes significant impact upon the neighboring residences and all measures possible shall be taken to minimize this impact. Detention of the excess flows at historic levels or less is mandatory.

Unless waived or amended in writing by the Town, the drainage report for commercial construction shall be prepared by an engineer licensed in Colorado and shall conform to these Criteria and any supplements.