APPENDIX A

SUBMITTALS CHECKLIST

CONSTRUCTION DRAWINGS CHECKLIST

PROJECT INFORMATION				
1. Project Name/Applicant Name:		2. Prepared by:		
3. Location/Address:				
4. Submittal Date:	(1)	(2)	(3)	(4)
5. Submitted by:	Firm:			
	Contact (name and email):			
	Phone:			

ITEM	Submittee to complete: Included (I), not included (NI), or not applicable (N/A)	Reviewer to complete: I, NI, or N/A
GENERAL SUBMITTAL REQUIREMENTS		
Overall submittal typed, bound study or PDF equivalent		
Signed and sealed P.E. certification statement and stamps and signatures on reports and plans		
I. General Information		
Title block (lower right-hand corner)		
North arrow		
Scale indicated (plan and profile)		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
Date and revisions		
Name of professional engineer or firm		
Professional engineer's seal and signature		
Certification statement (see below)		
Street names and easements with width descriptions		
Existing or planned utilities and structures (water, gas, telephone, storm drain, irrigation ditches, sanitary sewers)		
II. Plan Drawings		
North arrow		
Property lines and ownership or subdivision information		
III. Profile Drawings		
Vertical and horizontal grids with scales		
Ground surface existing (dotted) and proposed (solid)		
Existing utility lines where crossed		
Bench marks (USGS Datum)		
Elevations (USGS Datum)		
IV. Proposed Construction		
A. Pipes		
Plan and profile		
Size, type and structural class of pipe, including ASTM specification		
Grades		
Inlet and outlet details		
Manhole details (station number and invert elevations)		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
Bedding and backfilling details		
B. Open Channels		
Plan showing stationing		
Profile, including water-surface profiles		
Grades		
Typical cross-section		
Lining details		
C. Special Structures (manholes, culverts, headwalls, trash grates, etc.)		
Plan		
Elevation and water-surface profiles, details of design and appurtenances		
D. Streets, curb and gutter		
Reviewer Comments:		

Statement:

All work shall be constructed in accordance with Larimer County Standard Specifications as provided by the County Engineer, except as noted.

APPROVED: _____DATE: _____

DRAINAGE LETTER CHECKLIST

PROJECT INFORMATION				
1. Project Name/Applicant Name:		2. Prepared by:		
3. Location/Address:				
4. Submittal Date:	(1)	(2)	(3)	(4)
5. Submitted by:	Firm:			
	Contact (name and email):			
	Phone:			

ITEM	Submittee to complete: Included (I), not included (NI), or not applicable (N/A)	Reviewer to complete: I, NI, or N/A
GENERAL SUBMITTAL REQUIREMENTS		
Overall submittal typed, bound study or PDF equivalent		
Signed and sealed P.E. certification statement and stamps and signatures on reports and plans, if required		
DRAINAGE NARRATIVE		
Project location		
General project description		
Proposed land use(s)		
Discuss how water flows onto the site, how flows are conveyed across the site, and where flows go when leaving the site		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
Easements within and adjacent to the site		
Approximate area of land disturbance		
Sediment and erosion control during and after construction		
Applicable calculations and plan sets if changes to basin or drainage is proposed		
DRAINAGE FEATURES		
On-site or nearby drainage features (culverts, drainages, lakes/reservoirs, rivers, irrigation ditches, low ponding areas, wetlands)		
Photos of existing drainage features		
DRAINAGE PLAN		
Scale indicated		
North arrow		
Contours		
Property boundaries		
Flow arrows		
Drainage features		
Approximate location of existing and proposed structures		
Existing and proposed roads and access points		
Approximate location of any known drainage easements		
Approximate area of disturbance		
Reviewer Comments:		

FINAL DRAINAGE REPORT CHECKLIST

PROJECT INFORMATION				
1. Project Name/Applicant Name:		2. Prepared by:		
3. Location/Address:				
4. Submittal Date:	(1)	(2)	(3)	(4)
5. Submitted by:	Firm:			
	Contact (name and email):			
	Phone:			

ITEM	Submittee to complete: Included (I), not included (NI), or not applicable (N/A)	Reviewer to complete: I, NI, or N/A
GENERAL REPORT SUBMITTAL REQUIREMENTS		
Overall submittal typed, bound study or PDF equivalent		
Signed and sealed P.E. certification statement and stamps and signatures on reports and plans		
DRAINAGE NARRATIVE		
I. Introduction		
General project description		
Proposed land use(s)		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
II. General Location and Description		
A. Location		
City, county, and local streets within and adjacent to the site		
Township, range, section, ¼ section, lot(s) and block(s)		
Names of surrounding developments		
Location map		
B. Description of Property		
Site area		
Ground cover		
Soil types		
Infiltration test results or geotechnical study		
Groundwater characteristics, including depth to water table		
Identify major and sub-basins		
Existing drainage and water quality facilities		
Irrigation facilities on site or nearby related to site drainage		
Effect of development on hazard ratings of any reservoirs in area		
History of flooding		
Easements within and adjacent to the site		
III. Drainage Basins and Sub-basins		
A. Major Basin Descriptions		
Reference relevant MDP reports and FEMA FIRM panels		
Areas, existing and proposed land uses, imperviousness, soils information, overland and channelized slopes, and other parameters used in calculations		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
All nearby irrigation facilities that may be affected by local drainage		
All outfalls to major drainageways		
B. Sub-basin Descriptions		
Historical on-site and off-site sub-basin drainage patterns of the property and surrounding areas		
Proposed on-site and off-site sub-basin characteristics and impacts of development		
Sub-basin characteristics for existing and proposed conditions including area, existing and proposed land uses, imperviousness, hydrologic soil groups, overland and channelized slopes, and other physical parameters used for drainage calculations or analyses		
IV. Drainage Design Criteria		
A. Development Criteria References and Constraints		
Previous drainage studies		
Adjacent drainage studies		
Drainage impacts of site constraints		
B. Hydrologic Criteria		
Design rainfall and design storm recurrence intervals		
Hydrologic soil groups		
Calculate imperviousness		
Runoff calculation method		
Detention discharge and storage calculation method		
Other criteria or calculation methods		
C. Hydraulic Criteria		
Capacity analysis of existing and proposed drainage infrastructure		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
Floodplain analyses (if required)		
Other drainage facility design criteria used		
D. Stormwater Quality		
Describe how the project will satisfy MS4 permit		
V. Drainage Facility Design		
A. General Concept		
General drainage concepts		
Off-site runoff considerations		
Anticipated and proposed drainage patterns		
Discuss tables, charts, figures, and drawings		
B. Specific Details		
Drainage problems and solutions		
Design flows and detention storage volumes		
Existing stormwater conveyance and storage facilities		
Proposed stormwater conveyance, storage facilities, and outlet structures		
Spillway design included		
Structural and Non-structural Control Measures (SCMs)		
Maintenance access and aspects		
Easements and tracts		
Compliance with local, state, and federal requirements		
Describe safety hazards that may be associated with various drainage structures and the provisions that have been included in the design to minimize safety hazards		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
C. Variances		
Any requested variances from Larimer County drainage criteria or approved master plans		
VI. Conclusions		
A. Compliance with Standards		
Compliance with criteria in Larimer County Manual		
Compliance with Larimer County and FEMA floodplain rules and regulations		
B. Drainage Concept		
Drainage design will control damage from storm runoff		
Compatibility of proposed development with approved master plans		
Drainage impacts of proposed development on upstream and downstream properties		
C. Water Quality		
Compliance with CDPS MS4 Permit		
Post-construction design standards in the MS4 Permit will be met		
VII. References		
Criteria and technical information used		
VIII. Appendices		
A. Hydrologic Computations		
Land use assumptions for adjacent properties		
Historic and proposed runoff computations		
Calculations for WQCV, EURV, detention storage volumes, release rates, and drain time		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
B. Hydraulic Computations		
Culvert capacity calculations		
Street capacity and inlet calculations for minor storm runoff and major storm runoff		
Storm drain capacity calculations and profile showing hydraulic grade lines, ground surface grade, and pipe grade for the minor and major storms		
Detention area/volume capacity and outlet capacity calculations; include historic inflow, developed inflow, and outflow design hydrographs for detention facilities		
Stage-volume curves, outlet rating curves, spillway rating curves, and the method used to determine the rating curves for storm water storage facilities		
Documentation, water surface profiles for open channel. Designs for low-flow and trickle channel, stabilization (erosive velocities), and grade control		
Backwater profiles for open channels for the minor and major storm runoff with input data and procedures used for calculations		
Energy dissipation and calculations		
Downstream/outfall system capacity		
C. Floodplain Information		
FIRM		
D. Soils Information		
Soils map		
Soils report		
DRAINAGE PLAN		
IX. Drainage Plan Maps/Drawings		
A. Overall Drainage Map		
Scale indicated		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
Title block, legend, and north arrow		
Engineering firm name, professional engineering stamp, signature, and date		
Major basin and sub-basin boundaries		
Project/development boundaries		
Flow path for major drainageways		
Location and elevations of floodplain boundaries		
Drainage patterns entering, leaving, and within the site		
Existing and proposed stormwater management facilities		
B. Detailed Drainage Plan		
Scale indicated		
Title block, legend, and north arrow		
Existing/proposed contours at 2-foot maximum intervals on USGS Datum		
Location and elevations of USGS Benchmarks. All elevations shall be on USGS Datum		
Minimum lowest floor elevations for protection from major storm runoff		
Major basin and sub-basin boundaries, area, and imperviousness		
Definition of overland and channelized flow paths used for time of concentration calculation		
Location and elevations of floodplain boundaries		
Routing and accumulation of flows at design points for minor and major storm runoff		
Property lines, easements, and right-of-way		
Location and elevations of existing and proposed utilities and structures		
Streets, names, and grades		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
Off-site features influencing drainage through the development		
Existing drainage facilities and structures		
Proposed types of curb and gutter and gutter flow direction, including cross pans		
Proposed storm drains and open drainageways, including proposed inlets, manholes, culverts, and other appurtenances		
Proposed outfall points for runoff from study area		
Locations and footprints of water quality and/or detention facilities		
Volumes and release rates for detention storage facilities		
EROSION CONTROL PLAN		
Reviewer Comments:		

Certification:

I hereby certify that this report (plan) for the final drainage design of _____ was prepared by me (or under my direct supervision) for the owners thereof and meets or exceeds the criteria in the Larimer County Stormwater Design Standards.

_____

Licensed Professional Engineer
State of Colorado No. _____
(Seal)

PRELIMINARY DRAINAGE REPORT CHECKLIST

PROJECT INFORMATION				
1. Project Name/Applicant Name:		2. Prepared by:		
3. Location/Address:				
4. Submittal Date:	(1)	(2)	(3)	(4)
5. Submitted by:	Firm:			
	Contact (name and email):			
	Phone:			

ITEM	Submittee to complete: Included (I), not included (NI), or not applicable (N/A)	Reviewer to complete: I, NI, or N/A
GENERAL REPORT SUBMITTAL REQUIREMENTS		
Overall submittal typed, bound study or pdf equivalent		
Signed and sealed P.E. certification statement and stamps and signatures on reports and plans		
DRAINAGE NARRATIVE		
I. Introduction		
General project description		
Proposed land use(s)		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
II. General Location and Description		
A. Location		
City, county, and local streets within and adjacent to the site		
Township, range, section, ¼ section, lot(s) and block(s)		
Names of surrounding developments		
Location map		
B. Description of Property		
Site area		
Ground cover		
Soil types		
Infiltration test results or geotechnical study		
Groundwater characteristics, including depth to water table		
Identify major and sub-basins		
Existing drainage and water quality facilities		
Irrigation facilities on site or nearby related to site drainage		
Effect of development on hazard ratings of any reservoirs in area		
History of flooding		
Easements within and adjacent to the site		
III. Drainage Basins and Sub-basins		
A. Major Basin Descriptions		
Reference relevant MDP reports and FEMA FIRM panels		
Areas, existing and proposed land uses, imperviousness, soils information, overland and channelized slopes, and other parameters used in calculations		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
All nearby irrigation facilities that may be affected by local drainage		
All outfalls to major drainageways		
B. Sub-basin Descriptions		
Historical on-site and off-site sub-basin drainage patterns of the property and surrounding areas		
Proposed on-site and off-site sub-basin characteristics and impacts of development		
Sub-basin characteristics for existing and proposed conditions including area, existing and proposed land uses, imperviousness, hydrologic soil groups, overland and channelized slopes, and other physical parameters used for drainage calculations or analyses		
IV. Drainage Design Criteria		
A. Development Criteria References and Constraints		
Previous drainage studies		
Adjacent drainage studies		
Drainage impacts of site constraints		
B. Hydrologic Criteria		
Design rainfall and design storm recurrence intervals		
Hydrologic soil groups		
Calculate imperviousness		
Runoff calculation method		
Preliminary detention discharge and storage calculation method		
Other criteria or calculation methods		
C. Hydraulic Criteria		
Preliminary capacity analysis of existing and proposed drainage infrastructure		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
Floodplain analyses (if required)		
Other preliminary drainage facility design criteria used		
D. Stormwater Quality		
Describe how the project will satisfy MS4 permit		
V. Drainage Facility Design		
A. General Concept		
General drainage concepts		
Off-site runoff considerations		
Anticipated and proposed drainage patterns		
Discuss tables, charts, figures, and drawings		
B. Specific Details		
Drainage problems and preliminary solutions		
Preliminary design flows and detention storage volumes		
Existing stormwater conveyance and storage facilities		
Proposed stormwater conveyance, storage facilities, and outlet structures		
Structural and Non-structural Control Measures (SCMs)		
Maintenance		
Easements		
Compliance with local, state, and federal requirements		
C. Variances		
Any requested variances from Larimer County drainage criteria or approved master plans		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
VI. Conclusions		
A. Compliance with Standards		
Compliance with criteria in Larimer County Manual		
Compliance with Larimer County and FEMA floodplain rules and regulations		
B. Drainage Concept		
Drainage design will control damage from storm runoff		
Compatibility of proposed development with approved master plans		
Drainage impacts of proposed development on upstream and downstream properties		
C. Water Quality		
Compliance with CDPS MS4 Permit		
Post-construction design standards in the MS4 Permit will be met		
VII. References		
Criteria and technical information used		
VIII. Appendices		
A. Hydrologic Computations		
Land use assumptions for adjacent properties		
Historic and proposed runoff computations		
Preliminary calculations for WQCV, EURV, detention storage volumes, release rates, and drain time		
B. Hydraulic Computations		
Detention area/volume capacity		
Preliminary capacity analysis for any proposed control measures		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
C. Floodplain Information		
FIRM		
D. Soils Information		
Soils map		
Soils report		
DRAINAGE PLAN		
I. Overall Drainage Map		
Scale indicated		
Title block, legend, and north arrow		
Engineering firm name, professional engineering stamp, signature, and date		
Major basin and sub-basin boundaries		
Project/development boundaries		
Flow path for major drainageways		
Location and elevations of floodplain boundaries		
Drainage patterns entering, leaving, and within the site		
Existing and proposed stormwater management facilities		
II. Detailed Drainage Plan		
Scale indicated		
Title block, legend, and north arrow		
Existing/proposed contours at 2-foot maximum intervals on USGS Datum		
Location and elevations of USGS Benchmarks. All elevations shall be on USGS Datum.		
Minimum lowest floor elevations for protection from major storm runoff		

ITEM	Submittee to complete: I, NI, or N/A	Reviewer to complete: I, NI, or N/A
Major basin and sub-basin boundaries, area, and imperviousness		
Definition of overland and channelized flow paths used for time of concentration calculation		
Location and elevations of floodplain boundaries		
Routing and accumulative flows at design points for minor and major storm runoff		
Property lines, easements, and right-of-way		
Location and elevations of existing and proposed utilities and structures		
Streets, names, and grades		
Off-site features influencing drainage through the development		
Existing drainage facilities and structures		
Proposed types of curb and gutter and gutter flow direction, including cross pans		
Proposed storm drains and open drainageways, including proposed inlets, manholes, culverts, and other appurtenances		
Proposed outfall points for runoff from study area		
Locations and footprints of water quality and/or detention facilities		
Proposed volumes and release rates for detention storage facilities		
Reviewer Comments:		

Certification:

I hereby certify that this report (plan) for the preliminary drainage design of _____ was prepared by me (or under my direct supervision) for the owners thereof and meets or exceeds the criteria in the Larimer County Stormwater Design Standards.

_____

Licensed Professional Engineer
State of Colorado No. _____
(Seal)