Architecture, Engineering, and Construction Division

Civil Analysis, Design, Drawing, and Construction Checklists - Extended

The latest version of this document is available to Church Employees and Consultants on the AEC Website without needing a password:

* <https://aec.churchofjesuschrist.org/design_guidelines/>: Select and download *Civil Analysis, Design, Drawing and Construction Checklists, Extended under* “CIVIL”.
* The template can also be directly downloaded using this hyperlink: [*Civil Analysis, Design, Drawing, and Construction Checklists, Extended*](https://aec.churchofjesuschrist.org/design_guidelines/SupportDocs/ExtendedCivilAnalysisDesignDrawingAndConstructionChecklists.docx).

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with questions or suggestions for improvement.

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All previous versions of this document are obsolete.

Contact AEC with questions, feedback, or suggestions for improvement.

Salt Lake City, Utah

**Civil Analysis, Design, Drawing, and Construction Checklists - Extended**

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**Civil Analysis, Design, Drawing, and Construction Checklists - Extended**

Project Name:

Project Number:

Date:

The following checklists are provided as a guide to encourage thorough review and completion of the civil contract documents. They are intended to promote the production of high-quality civil contract documents with minimal errors. They are not to be interpreted as representing all items that the civil engineer should consider. Not all items in these checklists will be applicable to the project and will vary depending upon the agreement(s) made with the Owner’s Representative and the area in which the project is to be built. These lists have been developed based on Owner experience and other resources. The [*Civil Analysis, Design, and Drawing Checklist, Abbreviated*](http://aec.churchofjesuschrist.org/aec/design_guidelines/SupportDocs/AbbreviatedCivilAnalysisDesignAndDrawingChecklist.docx) is available on the [AEC Website](https://aec.churchofjesuschrist.org/design_guidelines/).

# CIVIL SCOPE, CRITERIA, ANALYSIS AND DESIGN

## Building Codes, Project Information and Miscellaneous Items

Obtain, read and understand the “[*United States and Canada Design Guidelines*](http://aec.churchofjesuschrist.org/aec/design_guidelines/AECDesignGuidelines.pdf?t=2015_2_5_16_1)*”* and the “[*Architectural, Civil and Landscaping Site Development Checklist*](http://aec.churchofjesuschrist.org/aec/design_guidelines/SupportDocs/Architectural_Civil_and_Landscaping_Site_Development_Checklist.docx)”?

Download and use the Approved Civil Detail Sheets located at [*Site Civil Resources*](http://aec.churchofjesuschrist.org/aec/civil/) using the password “nephi”. The details, including the storage buildings, are to be site adapted and supplemented with additional details according to the needs of the project. If a pavilion is used, download and site adapt the Approved Pavilion Drawings located at [*Approved* *Pavilion Drawings*](http://aec.churchofjesuschrist.org/aec/standard_plans/pavilion/) using the password “nephi”.

Determine applicable codes and any special design provisions required by local codes and authority having jurisdiction?

Determine whether the “authority having jurisdiction” (AHJ) has a stormwater utility; if so, identify utility credit procedures and application? Carry forward through design BMPs necessary to obtain utility credits?

Determine the approval process?

Does property need to be re-zoned?

Determine time frame for rezoning?

Is a Unity of Title required?

Does property need to be platted?

Is a preliminary and final plat required?

Review the “authority having jurisdiction’s” (AHJ) approval process and their time frames?

Determine what community interaction meetings are required?

Neighborhood notifications?

City planning approvals?

City council approvals?

Does the AHJ require or allow for separate metering devices for culinary water and irrigation water? The Owner requires separate metering devices.

Will the culinary water source be a well or the city water supply?

Will a septic sanitary sewer system be used, or will the sanitary sewer be connected into the city’s sanitary sewer system?

Determine what utility services are available and required for the property (culinary water, irrigation water, stormwater sewer, sanitary sewer, natural gas, phone, communication, high speed internet, and so forth)?

Collect contact information for each utility service provider?

Determine the process for obtaining service from each utility service provider?

Determine stormwater credit application process and requirements if available for the project?

Coordinate this with the project architect and project manager to identify and carry forward through design the “best management practices” (BMP) necessary to obtain utility credits?

Contact the local Fire Marshall to confirm if new onsite and/or offsite fire hydrants are required?

Contact the Water District to confirm if onsite fire hydrants and fire mains will be publicly or privately owned?

Determine easement requirements?

Is a traffic study required?

Determine access to the site?

Are off-site improvements within the public right of way required as an expense to the Owner (this could be significant in design fees and construction costs)?

Determine the zoned building and parking lot setback requirements?

Is a variance from the AHJ needed?

Determine the occupancy category or risk category of the building per code, but verify whether a higher category is required by the “AEC Design Guidelines”?

For handicap access, determine the “Americans with Disability Act” (ADA), AHJ and “[*AEC Design Guidelines*](http://aec.churchofjesuschrist.org/aec/design_guidelines/AECDesignGuidelines.pdf?t=2015_2_5_16_1)” requirements?

## Client/Owner Supplied Civil Information

Confirm with the Architect whether the building will be fire sprinkled or not?

Review Owner and AHJ requirements for parking and landscaping (sidewalks, mow strips and so forth)?

Consider landscape buffers, screening of parking areas, screening of trash dumpsters, fencing requirements, site lighting requirements, parking space requirements, ingress requirements, egress requirements, open space requirements, and minimal tree and shrub requirements?

Review Owner and AHJ requirements for site signage requirements and allowances?

Determine the irrigation requirements (controller requirements, water service type and size and components)?

Obtain the prepared Boundary and Topographic (ALTA) Survey Plan. If not available, ask to have one prepared by a surveyor through a contract with the Owner?

Obtain a Geotechnical Evaluation Report from Owner?

Evaluate the impact and remedies for moisture (expansive or collapsible) or load sensitive soils?

Obtain the Phase I Environmental Assessment Report from the Owner?

Obtain Title Report for ownerships and encumbrances?

Obtain any preliminary site plans/landscaping plans from the Owner?

Evaluate the grading plan early for cut and fill requirements? Try to balance the site.

Evaluate the amount and type of import fill required?

Obtain dimensioned floor plans and elevations from the Owner?

Determine the required sheet size and title block to be used?

Determine any special drafting standards and/or drafting formats required by the Owner?

Obtain the overall project budget and the budget for the civil portion from the Owner?

Determine from the Owner if future expansion of the building is being considered (many Church projects can be built in phases)?

Determine the Owner’s security requirements (fences, etc.)?

Work with the design team to site the building?

Orient the building for best public view and access with the steeple towards the primary street?

If possible, try to orient the building main entrance facing the warm side of the building to help keep the ice and snow off the sidewalks and handicap parking?

Determine whether a pavilion or storage building is required?

## Miscellaneous Civil Information

Locate the dumpster so as not to detract from the view of the meetinghouse?

Locate the storage building so as not to detract from the view of the meetinghouse?

Determine if a subsurface drainage system is required to protect the building, the paving system or other site elements?

Design subsurface drainage system to comply with local code requirements?

Use separate systems to collect surface water and subsurface water?

Subsurface drainage system includes lift stations, pumping stations, vaults, manholes, cleanouts and so forth? Avoid these measures whenever possible.

Is the site located in a FEMA designated flood plain?

Does the AHJ allow building in a designated flood plain?

Determine what flood plain details are required and what issues need to be addressed?

Review the site for endangered species (this is not usually significant on small sites)?

Is a letter from the Fish and Wildlife Service or the State Wildlife Department needed for clearance?

Review the site for cultural resource issues (archaeological and historic preservation)

Is a letter from the state historic society needed for clearance?

Review the site conditions for water of the U.S. (jurisdictional ponds, creeks, wetlands)?

Evaluate permit process if impacted by jurisdictional water of the U.S. Evaluate permit process (may be time consuming; nationwide permit or individual permit)?

### Stormwater Pollution and Prevention Plan (SWPPP):

General:

Does the Owner or AHJ require a SWPPP or equal (note that SWPPP requires an Erosion Control Plan and that a SWPPP is not required for sites that are smaller than 1 acre in size although the AHJ may require an Erosion Control Plan)?

Has the civil engineer been contracted to provide a SWPPP or equal? Is one needed?

Refer to Attachment A - SUMMARY OF SWPPP REQUIRED CONTENTS and Attachment B - SAMPLE CONCEPT SWPPP PRECONSTRUCTION REVIEW TEMPLATE at the end of these checklists? These are reconstructed from the EPA template.

Has the civil engineer been contracted to provide an Erosion Control Plan or equal? Is one needed?

Does the Owner or AHJ require a Post-Construction Stormwater Management Plan (Stormwater Maintenance Plan)?

Has the Civil Engineer been contracted to provide a Post-Construction Stormwater Management Plan (Stormwater Maintenance Plan) or equal? Is one needed?

### Stormwater Pollution and Prevention Codes:

Use the Federal EPA SWPPP requirements or equal as required by the AHJ found at https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=60000FNM.txt “Developing Your Stormwater Pollution Prevention Plan - A Guide for Construction Sites” (individual states and cities will often have their own versions of templates, forms, details and so forth)?

A portion of the SWPPP is to be prepared prior to bidding with the balance of the SWPPP finalized with the selected general contractor.

The SWPPP demonstrates how a site will comply with the requirements in NPDES stormwater permits.

Use the EPA Construction SWPPP template, or equal as required by the AHJ, found at [Construction General Permit Resources, Tools, and Templates | US EPA](https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates) (individual states and cities will often have their own versions of templates, forms, details and so forth). Utah’s requirements for SWPPP are found at [http://www.waterquality.utah.gov/UPDES/stormwater/documents/General Construction PermiUTR3000000t.pdf](http://www.waterquality.utah.gov/UPDES/stormwater/documents/General%20%09Construction%20PermiUTR3000000t.pdf)).

Identify potential sources of stormwater pollution?

Describe BMP to reduce pollutants and the volume of stormwater discharges?

Identify the BMP to be implemented?

Describe each major phase of construction?

Outline the roles and responsibilities of contractors and subcontractors?

Evaluate BMP effectiveness?

Document inspections in the SWPPP?

BMP will change as the project proceeds?

Remember to include in the SWPPP:

Reporting and inspection requirements?

Information for inspecting and maintaining BMP?

Site signage indicating where the SWPPP information can be found?

Maintenance of the project site?

Responsible party for each element?

Determine the supplemental requirements of the state, city and AHJ, such as an Erosion Control Plan (different processes, forms and conformance are required by the different AHJs)?

Inquire as to any local land disturbance requirements at the city level? These may be different from the state’s requirements.

### Miscellaneous SWPPP Items:

Consider creating and using a SWPPP review checklist for design and construction?

Determine where sediment filters are needed or required?

Determine whether the down-stream receiving waters are designated as recreational areas or wildlife refuges, or are otherwise important to the local community?

Additional requirements for proper erosion and run-off controls?

Identify if the downstream receiving waters have been listed as "impaired" by the EPA or local governing agency?

Additional mitigation requirements will be mandatory?

Check the local state 303(d) list for specific impairments?

Owner can be held responsible by downstream home associations if disturbed areas add silt to existing lakes/ponds?

Document why a selected BMP was chosen and what results are expected?

Document the sizing of BMP?

Provide a rain gauge at the site?

Minimize disturbed areas?

Minimize clearing and grading?

Phase construction to limit soil exposure?

Phase the construction activity to limit the impact on erosion and allow for “best management practices” to be more manageable?

Immediately stabilize exposed soils?

Protect steep slopes and cuts?

Protect waterways? Minimum undisturbed buffer zones may apply?

Install perimeter controls to filter sediments?

Employ advanced sediment settling controls?

Certify and train contractors on stormwater site plan implementation?

Control waste at the construction site?

Clearly outline designated washout pads, track-out pads, disposal areas, and staging area? This tends to alleviate unnecessary disturbance in and around the sight.

Can the existing topsoil be used as part of BMP? Limiting the demolition impact on existing topsoil can be very advantageous. This can be accomplished by specifying trucking routes, stockpile locations and so forth?

Has the Owner been notified that the Owner is the responsible, and liable, party?

The Owner is generally required to sign the Stormwater Pollution and Prevention Plan?

Documents should be provided to the Owner for the Owner to have reviewed with the Owner’s counsel?

The Owner needs to have a good understanding of the project impacts, schedule, and contractor methods?

Longer construction period equals greater risk of violation?

Failures often occur over a period of time during which small incremental failures occur.

Typically, a contractor spends more time, effort and money progressively increasing levels of protection or repairing “best management practices” than would have been spent initially installing appropriate “best management practices” and maintaining them through the life of the project.

Owner/Contractor should understand the requirements for posting permits at the site and maintaining updated SWPPP for review if state or local representatives arrive at the project?

Inform the Owner/Contractor that the SWPPP is a changing document that must be updated during construction due to unknown conditions? Changes typically always occur.

Changes can be made by “redlining” the SWPPP, initialing and dating the changes.

Contractually arrange with the Owner the maintenance of “best management practices during construction”?

Inform the Owner/Contractor when a site is stabilized?

Have all required SWPPP notifications been distributed to necessary parties?

Responsibilities for Contractor are fully defined in contract documents including maintenance, inspections, and removal of BMP devices?

Inform the Owner/Contractor that they need to complete all requirements for terminating permits at the appropriate time (NOT – Notice of Termination)?

Clearly identify when BMP (silt fence, basins, berms, and so forth) associated with land disturbance should be removed (too often silt fence is left in place and becomes an eyesore)?

### Erosion and Sediment Control Plan Drawing Sheet:

Delineate the limits of disturbance?

Show designed extents of sedimentation ponds?

Note the proposed slopes that will need protection:

Provide mulching and tracking on anything over 10% slope?

Provide erosion control mats on anything over 3 horizontal to 1 vertical slope (3:1)?

Show temporary slope drains at tops of proposed slopes where drainage is likely to collect and review slopes before surface improvements are installed?

Show all existing downstream inlets that need protection?

Show inlet protection on all new storm drain inlets?

Consider inlet protection specific to each inlet:

Low points need to be protected differently than in-line inlets.

Adjust details, as necessary.

Show stockpile, staging, dumpster, and toilet area? Specify berming around toilet adequate to contain any spills?

Show outfall protection, if needed?

Show run-on bypass measures, if needed?

Show buffer strips and protected sensitive areas?

Place vehicle wash-down pad near construction access, or make it part of the construction access - adjacent swale to sedimentation pond?

Show one stabilized construction access and temporary barriers at other the other access locations where the site could otherwise be accessed and be in violation of the SWPPP?

Place a sign at the concrete cleanout basin/dumpster?

Place a sign at the site entrance as required by the SWPPP?

Design swales and/or silt fences to divert sediment-laden runoff to sedimentation basins. Silt fences are most effective when placed along contours. Silt fences running up and down hills do not retain silt, they divert it elsewhere. Temporary drainage swales may be more effective in this application than silt fences?

### Post-Construction Stormwater Maintenance:

Determine the AHJ’s stormwater design criteria, including recurrence intervals and durations?

Perform a site stormwater design analysis to evaluate the potential credits for stormwater system improvements?

Meet with the utility and complete the credit application process during the design phase of the project?

Site design should control storm volumes as well as peak flow rates to stormwater systems to match predevelopment conditions?

Provide drainage calculations?

Determine where sediment filters are needed or required?

Will surface stormwater be retained on-site?

Retention ponds?

Permeable pavements?

Biofiltration?

Dispersal trench?

Detention ponds with “skimmers”?

Aquatic buffers?

Swales/bioswales?

Sumps?

Rain gardens?

Buried retention storage chambers?

Have their life cycle costs, and maintenance requirements been compared against those of other systems?

Will surface stormwater be disposed of off-site by connection to the system recognized by the AHJ (stormwater fees charged by the AHJ may be lowered in some cases when the run-off and sediment load on the local storm drain system is reduced)?

Detention ponds?

Does stormwater have to be filtered before entering stormwater systems?

Does stormwater have to be filtered through vegetated areas to remove sediments before entering stormwater systems?

Buried detention storage chambers?

Have their life cycle costs, and maintenance requirements been compared against those of other systems?

Document inspections and maintenance activities?

Use reference manuals such as: “Mid-America Regional Council and American Public Works Association Manual of Best Management Practices for Stormwater Quality”?

Determine whether in addition to meeting construction permit requirements, whether the AHJ requires the Owner to submit a Post-Construction Stormwater Management Plan (Stormwater Maintenance Plan)?

Inspections should be conducted at least annually?

Define the potential pollutant sources?

Define what will be routinely done to mitigate the potential pollutant sources?

Provide standard operating procedures for landscaping and cleaning outdoor facilities?

Lawn mowing?

Lawn fertilizing?

Cleaning debris?

Cleaning grates?

Leaf removal in the fall?

Sweeping and maintaining parking lots?

Determine if a stormwater maintenance agreement between the local government and the Owner is required by the AHJ?

Performance of routine maintenance?

Maintenance schedules?

Inspection requirements?

Access to local officials to enter site?

## Water Rights and Drinking Water Permitting

Verify that all Owner water rights are in order relative to proposed water supply uses related to the project?

Based upon the review, prepare and file change applications as appropriate?

If the project involves the development of a new drinking water source, complete a Preliminary Evaluation Report as part of the Drinking Water Source Protection Plan requirements?

If the project involves any well drilling, ensure that Start Cards or the governing agency equivalent are acquired before commencing construction?

If the project includes any alteration to natural stream or river channels, prepare and apply for a stream alteration permit?

For any project that creates and/or modifies a public water system, submit all design documents for plan review with the proper local governing oversight agency? For example, in Utah the State Division of Drinking Water of the Dept. of Environmental Quality provides that administrative oversight.

Respond in writing to comments and/or requirements from the plan review process?

# CIVIL CONTRACT DOCUMENTS REVIEW

## Boundary and Topographical Survey Plans – General Format

### General Boundary and Topographical Survey Plan Information:

Do the boundary and topographical plans show the following?

The project name?

The name of the ward or branch and the stake or mission?

The church property number

The address?

The north arrow?

The drawing and detail scale?

The name and address of the licensed surveyor

Is the surveyor’s firm's name included in the sheet title block?

Is the seal and signature of the responsible land surveyor included on the plans (if applicable)?

Does the size of the plan sheets match the size of any architectural plan sheets?

Is the font type and font size used in the plans acceptable to the architect and conform to the Owner’s guidelines?

The plans should include a statement such as PRELIMINARY, CONCEPT, SCHEMATIC, DESIGN DEVELOPMENT, NOT FOR CONSTRUCTION, etc. until the plans are ready for final submittal.

Is the nomenclature throughout the plans consistent?

Has a list of definitions for abbreviations, symbols, marks, and legend symbols been provided on the plans?

Are the plans drawn to scale?

Are graphic scales included and are they drawn to scale?

Are the plans drawn to the scale required by the Owner’s guidelines?

### Miscellaneous Boundary Survey Plan Information:

Has the survey been based on the current edition of Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys or equivalent standard and plot the required details and information on the plat?

Have monuments (or a reference monument or witness to the corner) been placed at all major corners of the boundary of the property, unless already marked or referenced by existing monuments or witnesses?

Have the names of adjoining owners of platted lands according to current public records been included?

Have the ties to the government monument system including established state plane coordinates, county coordinates, and latitude and longitude of all monuments shown on the plat including the name of the coordinate system, datum, and project units been shown?

Are property corners shown on the plans?

Are the bearing, distance and curver data for all property lines shown?

Does the property description and the legal description include all ties to the government monument system?

Are all existing fences on or near the property lines shown?

Are encroachments, overlaps and gaps accounted for at adjoining properties?

Are all easements indicated as to underground, surface, and overhead items?

Are all alleys, right of ways and streets identified properly?

Is the legal description of the property certified by a licensed surveyor?

### Miscellaneous Topographical Survey Information:

Has the survey been based on the current edition of the Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys or equivalent standard?

Is the address or addresses, if disclosed in record documents, or observed while conducting the survey, provided?

Has the flood zone classification (with proper annotation based on federal flood insurance rate maps or the state or local equivalent) depicted by scaled map location and graphic plotting been provided?

Has the gross land area been provided?

Has the vertical relief with the source of the information, the contour interval, the datum, and identify the originating benchmark been provided?

Contours lines should:

Be provided for the entire site, 10 feet beyond all property lines, and to the far side of adjacent streets?

Show any rapid change in grade on adjacent properties?

Be provided at 0’-6” vertical intervals for sites with less than a 2 percent slope?

Be provided at 1’-0” vertical intervals for sites with between a 2 percent and a 10 percent slope?

Be provided at 2’-0” to 5’-0” vertical intervals for sites with greater than a 10 percent slope?

Have spot elevations of existing structures, curbs, crown of roads, gutters, walks, drainage structures, catch basins, building entrances, roads and so forth been provided?

Have the exterior dimensions and the square footage of the exterior footprint of all buildings been provided?

Has the measured height of all buildings above grade at a location specified by the Owner’s representative been provided?

In addition to the features noted in the above standard, substantial features observed in the process of conducting the survey such as parking lots, billboards, signs, swimming pools, landscaped areas, trees of 4 inches (10 cm) diameter or larger showing description and size, rock outcroppings, boulders, above and below ground storage tanks, wells, ditches, canals, springs, seeps, swamps, other structures or foundations and so forth should be shown?

Striping, number of types of parking spaces in parking areas, lots and structures should be shown (i.e., handicapped, motorcycle, regular and so forth)?

The relationship and location of division or party walls with respect to adjoining properties and the degree of plumb should be shown?

The location of utilities existing on or serving the surveyed property as determined by observed evidence together with evidence from plans obtained from utility companies and markings by utility companies and other appropriate sources with reference to the source of information should be shown? These include:

Railroad tracks, spurs, and sidings?

Manholes, catch basins, valve vaults, and other surface indications of subterranean uses?

Wires and cables (including their function, if readily identifiable) that cross the surveyed property and all poles on or within 10 feet (3 m) of the surveyed property? Without expressing a legal opinion as to the ownership or nature of the potential encroachments, the dimensions of all encroaching utility pole cross members or overhangs should be provided.

Utility company installations on the surveyed property?

Water lines: size and approximate depth?

Natural gas lines: size and approximate depth?

Sewer lines: size and invert elevations?

Storm drainage lines: size and invert elevations?

Power lines and poles or underground location and depth?

Telephone lines and poles or underground location and depth?

Fire hydrants: location?

The distance to other nearest intersecting streets should be shown?

Driveways and streets adjacent to or on the opposite side of the streets should be shown?

Observed evidence of current earth moving work, building construction, or building additions should be shown?

Proposed changes in street right of way lines if information is available from the controlling jurisdiction and observed evidence of recent street or sidewalk construction or repairs should be shown?

Observed evidence of site use as a solid waste dump, sump, or sanitary landfill should be shown?

The location of wetland areas as determined by the appropriate authorities should be shown?

Locate improvements within any off-site easements or servitudes benefitting the surveyed property that are disclosed in the record documents provided to the surveyor and that are observed in the process of conducting the survey?

Is there an established permanent benchmark shown on or near the site?

Is the benchmark referenced to sea level where possible?

Can the finished floor elevation be determined from the benchmark?

Can the finished floor elevation of the storage building be determined?

Are there any unusual site characteristics that should be shown?

## Civil Contract Drawings and Details - General Format

Does the title block information on the civil plans match that of the architect’s plans?

Do the civil plans show?

The project name?

The name of the ward or branch and the stake or mission?

The church property number?

The address?

The north arrow?

The drawing and detail scale?

The name and address of the civil engineer?

Is the civil engineer’s firm's name included in the sheet title block with the name of the CAD operator, the design engineer, and the reviewing engineer?

Is the seal and signature of the civil engineer included on the drawings (if applicable)?

Does the size of the civil plan sheets match the size of the architectural plan sheets?

Is the font type and font size used in the plans acceptable to the architect and conform to the Owner’s guidelines?

The plans should include a statement such as PRELIMINARY, CONCEPT, SCHEMATIC, DESIGN DEVELOPMENT, NOT FOR CONSTRUCTION, etc. until the plans are ready for final submittal?

Do the civil sheet titles and drawing numbers match the sheet titles and drawing numbers used in the General Drawing Index?

Is the nomenclature throughout the drawings, details, and specifications consistent?

Has a list of definitions for abbreviations, symbols, marks, and legend symbols been provided on the plans?

Are the plans drawn to scale?

Are graphic scales included and are they drawn to scale?

Are the plans drawn to the scale required by the Owner’s guidelines?

Existing construction should be shown “grayscale” with “(E)” or “EXISTING”?

Dimension the location of new construction with respect to existing construction?

Dimensions that need to be “field verified” should be clearly noted?

Revisions to final plans (inclusion of addenda, change of scope, requests for clarifications and so forth) should be “clouded” with the revision date and a revision description?

## Civil Contract Drawings and Details

### General:

Has a letter from the geotechnical engineer stating that the civil plans and specifications were reviewed and were prepared in accordance with the geotechnical evaluation report recommendations and requirements been provided?

Have the different discipline plans and details been coordinated (culinary water, irrigation water, stormwater sewer, sanitary sewer, natural gas, phone, communication, high speed internet, and so forth)?

Are basic civil design criteria for the project correct and clearly stated on plans?

Have civil calculations for stormwater drainage been submitted?

Do the stormwater calculations ensure that the basis of design criteria was followed and are they clearly shown in the civil drawings and details?

Do the civil construction drawings and details meet the scope of the project as originally defined?

Has the interior concrete building slab on grade elevation been established to permit positive drainage away from the building?

Have the requirements of the Geotechnical Evaluation Report been incorporated into the plans and specifications? Has the information been coordinated?

Have the utility services such as transformers, mechanical equipment, cooling towers, storage sheds, etc. been located so as not to detract from the building or obstruct future expansion?

Has “nonfrost susceptible soil” been used beneath sidewalks and other concrete site elements.

Have requirements for mitigating the effects of moisture sensitive soils been incorporated into the plans and specifications to protect sidewalks and other concrete site elements?

### Parking and Paving:

The paving system has been selected based upon total cost of ownership?

Is the selected paving system appropriate for the site?

Specifications for paving and earthwork have been site adapted for local conditions and temperatures and incorporate the recommendations of the geotechnical evaluation report?

Is the paving system designed and detailed for a 40-year minimum life? The Owner design criteria should be used for design (see the “Geotechnical Evaluation Report Template” for loading design criteria) unless determined otherwise by the design team.

Provide a separate design for the paving system around the trash enclosure to support garbage trucks?

Are the parking stalls a minimum of 8'-6" wide and 18'-0" deep?

Preferred size should be 9'-0" wide and 20'-0" deep?

Are the overall parking lot widths as follows:

90 degree right angle parking - 65 ft preferred (60 ft minimum)?

60 degree diagonal parking - 60 ft preferred (55 ft minimum)?

45 degree diagonal parking - 55 ft preferred (50 ft minimum)?

Are there enough parking stalls on the site? The following number of parking stalls are recommended (verify the required number of stalls with the project manager):

Stake center buildings – 230 to 280 parking stalls?

Multi-ward buildings – 130 to 170 parking stalls?

First phase buildings – 30 to 50 parking stalls?

Second phase buildings – 60 to 100 parking stalls?

Third phase buildings – 120 to 180 parking stalls?

Does the parking lot layout include handicap accessible stalls?

Has ingress and egress been clearly noted?

Has the paving system been designed to ensure that all paving surfaces drain? Have the following minimum slopes been provided:

½% minimum grade provided at concrete curb and gutter flow lines?

1% minimum grade for concrete to drainage outlets?

2% minimum grade for asphalt to drainage outlets?

5% maximum grade on parking surfaces?

Has curb and gutter been provided around the perimeter?

If possible, drain to the perimeter, not to interior catch basins, to make placement of the paving easier and to obtain a better quality job.

### Asphalt Paving:

Has a minimum asphalt paving thickness of 3 inches over 6 inches of aggregate base been provided (verify with recommendations of geotechnical evaluation report)?

Has sub-surface drainage where ground water is a problem been provided?

Have adequate spot elevations been provided?

Have slopes been indicated?

### Concrete Paving:

Has a minimum concrete paving thickness of 4 inches over 4 inches of aggregate base been provided (verify with recommendations of geotechnical evaluation report)?

Have control and expansion joints have been shown and detailed?

Has the control joint spacing been limited to about 24 times the slab thickness?

Has the water/cementitious ratio been limited to .40 in areas of freeze thaw and to 45 in other areas?

Has 4,500 psi concrete in areas of freeze thaw been required and 4,000 psi in other areas (unless higher strengths are needed to protect against corrosive soils)?

Have adequate spot elevations been provided?

Have slopes been indicated?

### Site drainage:

Have drainage calculations been completed?

Have grates and piping been sized for the calculated flows?

Is the site located in a FEMA designated flood plain?

Establish the finish floor elevation 1 foot above the 100-year flood level?

Is the finish floor elevation 6 inches above the high point of the finished grade adjacent to the building? Grading at entries is an exception.

Verify that finish grades slope away from building per Owner guidelines (i.e., 1/4” per foot for 12’ with finish grades being 6” lower than the finish floor elevations against the building except at entries and mechanical equipment pads)? Grading at entries is an exception.

Is stormwater drained away from the building?

Downspouts and rain gutters are required where moisture sensitive soils are located. Are downspouts for rain gutters required for the project and are they called out?

Have downspouts for rain gutters been properly sized (large enough), at an adequate slope and detailed, if they are required?

Downspouts and rain gutters must remain accessible for cleaning?

If the soils around the building are moisture sensitive, has a foundation and footing drainage system (subsurface drainage system) to control stormwater or ground water been provided?

Do not connect surface water drainage systems with subsurface drainage systems?

Is stormwater runoff disposed of in a manner acceptable to the AHJ without causing problems for adjacent property owners (A WRITTEN AND OWNER APPROVED AGREEMENT IS REQUIRED IF NOT)?

If stormwater runoff from the property is discharged on or through adjacent property, do we have a written agreement granting this right for perpetuity (A WRITTEN AND OWNER APPROVED AGEEEMENT IS REQUIRED)?

Has a review for the possibility of off-site stormwater coming onto the project site and/or through it from surrounding areas been performed?

Are existing drainage channels designed and detailed to properly control and dispose of this water?

The paving surface should not be used for ponding stormwater from the 10-year storm when detention or retention is required.

Do not use paving as storage areas for 10-year storm? Runoff in excess of the 10-year storm may be ponded on the paving surface.

Have stormwater retention or detention areas been designed and detailed?

Indicate required volumes of water to be stored in retention or detention basins?

Are the required volumes of water verified with the run-off calculations?

Have dimensions and elevations for retention or detention ponds, detention basins or retention basins been provided?

Are riprap, inverts, inlets, outlets, grates, manholes, concrete swales, culverts, piping, and similar items well defined and detailed in the construction documents?

Have elevations for these items been provided? Have top of grate and flow line elevations been provided?

Are mow strips, sidewalks and other site concrete items set at elevations to prevent trapping stormwater against the building foundation walls?

Have area drains in lawn and paved areas been used as needed to achieve slopes required by Owner guidelines?

Are detectable warning panels required by the AHJ and have they been provided?

Have AHJ directed improvements been incorporated? These might include:

Off-site adjoining streets?

Water lines?

Sewer lines?

Sidewalks?

Roads?

Have the civil standard plan detail sheets been used and have details that do not apply been removed?

Have the remainder been site adapted and augmented?

Have the codes used for the project been noted on the contract documents?

Have the plans been drawn at a minimum scale of 1 inch = 20 feet (1:240)? Do the plans include?

The benchmark location and elevation?

The contour lines? Contour lines should:

Be provided for the entire site, 10 feet beyond all property lines, and to the far side of adjacent streets?

Show any rapid change in grade on adjacent properties?

Be provided at 0’-6” vertical intervals for sites with less than a 2 percent slope?

Be provided at 1’-0” vertical intervals for sites with between a 2 percent and a 10 percent slope?

Be provided at 2’-0” to 5’-0” vertical intervals for sites with greater than a 10 percent slope?

Existing and finished spot elevations for existing and new concrete structures including building slabs, building entrances, equipment slabs, catch basins, curb cuts to off-site streets, beginning and ending of slopes for walkways, curbs, inverts, gutters, and waterways?

Enough top of mow strip and other site element elevations to ensure correct installation?

Dimensions from site elements to property lines?

Dimensions for walkways, curbs, gutters, drainage swales, structures, equipment slabs, paving, fences, and buildings?

Sections of roads, streets, and site entrances?

One (minimum) longitudinal cross section and two (minimum) transverse cross sections through the building and the site indicating existing and final grades and indicating the final building interior slab on grade elevations?

The location of utility lines and their connections, both on-site and off-site?

The elevation contours of water elevations for both the 10 year and the 100-year 24-hour storms at areas used for detention or retention of water?

The locations of control and expansion joints in concrete paving, curbs, gutters, sidewalks, and mow strips?

Joints in concrete paving should match joints in curbs, gutters and sidewalks? Ideally, the joints would match the parking stall widths.

Right of ways and easements?

Locations of light poles?

Locations of any flag poles?

Locations of any retaining walls?

Have retaining walls been designed and detailed?

Is the civil engineer responsible for the design and detailing of retaining walls or miscellaneous site walls or is the structural engineer responsible?

Locations of any exterior stairs?

Have stairs and handrails been designed and detailed (standard civil details may suffice)?

Fire lane access?

Any locally required setbacks for the building and the parking at front, rear, and sides and any/or any greenbelt open spaces requirements?

Have the requirements for civil inspections and tests been incorporated into the civil specifications?

Earthwork?

Site concrete?

Concrete paving?

Asphalt paving?

Utilities?

Is the sewer connection depth adequate to accommodate and drain a baptismal font, if one is used?

# CIVIL CONSTRUCTION

## Responsibilities, Observations and Civil Materials Inspections and Tests:

Have the number of civil engineering site observations to be performed by the civil engineer been contractually established (this is usually established in the Agreement Between Owner and Architect)?

Is the civil engineer to attend pre-installation meetings (this is usually established in the Agreement Between Owner and Architect)?

The civil engineer is to verify that the work on the project site is as shown in the civil plans and specifications. The civil engineer is to provide site observation reports to the project manager, the architect, and the contractor.

The civil engineer shall submit to the architect a written statement that the site observations have been made and that any deficiencies have been identified and reported and to the best of the civil engineer’s knowledge have been resolved. Provide written site observation reports within 24 hours of each observation being made.

The civil engineer is to review mix designs, shop drawing layouts for jointing plans, and miscellaneous shop drawings for exterior site work (curb, gutter, paving, etc.).

The civil engineer is to review inspection and test results and provide recommendations to the architect whether to accept or reject the tested work based on the inspections performed and test results.

Subgrade compaction test results

Aggregate base compaction test results

Concrete compressive test results

Asphalt compaction test results

The civil engineer finalizes any documentation required by the AHJ (SWPPP and so forth).

### Requirements for Water System:

The civil engineer shall submit to the Owner the following:

A statement from a registered professional engineer that all conditions of Plan Approval were accomplished ("certification of rule conformance").

Record Drawings unless no changes are made from previously submitted and approved plans during construction.

Confirmation that a copy of the Record Drawings has been received by the water system owner.

Evidence of proper flushing and disinfection in accordance with the appropriate ANSI/AWWA Standard.

Where appropriate, water quality data.

A statement from the Engineer indicating what changes to the project were necessary during construction, and certification that all these changes were in conformance with these rules ("certification of rule conformance").

All other documentation which may have been required during the plan review process and,

Confirmation that the Owner has been provided with an Operation and Maintenance manual for the water system for the new facility.

The civil engineer shall submit to the governing oversight agency, Record Drawings along with other required sampling and testing result submittals for issuance of an operating permit for the public water system.

Within 1 year of completion of a new drinking water source (spring or well), complete a final Drinking Water Source Protection Plan utilizing data from the construction process (pump test) to finalize protection zone delineation. Submit final DWSP Plan to the proper oversight agency for review and filing.

Complete and record all necessary Land Use Agreements.

The contractor shall prepare and submit to Owner for review, an Operations and Maintenance Manual. The O&M manual shall be maintained onsite for the system operator’s future reference.

# ATTACHMENT A – BASIC EPA SUMMARY OF SWPPP REQUIRED CONTENTS

**Review these items with current EPA requirements:**

SWPPP must be signed by operators (Owner of site, contractor, and subcontractors).

Provide site description information:

Provide the nature and sequence of construction activities:

Provide a description of the finished product? Provide information about the subdivision including density, whether it is a commercial site, etc.?

Provide a description of the necessary construction activities (site clearing, linear construction, streets, mass excavation, vertical construction, etc.)?

Provide the total area of the site and the total disturbed area?

Provide the preconstruction and post-construction runoff coefficients? Provide the hardscape area before and after construction?

Provide a description of the site soils?

Provide the names of the potential and actual receiving waters? If stormwater is directed into a storm drain system, provide the location where the storm drain discharges to a water of the state?

Provide a map depicting water drainage patterns and outfall locations for the project (Grading and Drainage Plan)?

Provide a map depicting areas of soil disturbance (Erosion and Sediment Control Plan)?

Provide a map depicting the location of major structural controls:

Permanent controls (Grading and Drainage Plan, Landscape Plan)?

Temporary controls (Erosion and Sediment Control Plan)?

Provide a map depicting the locations of materials storage and equipment support areas (Erosion and Sediment Control Plan)?

Controls to reduce pollutants:

Provide a description of interim and permanent stabilization practices (seeding, mulching, etc.)?

Provide roles and responsibilities of the contractors and the timing by which stabilization practices will be implemented?

Provide a description of structural practices (silt fences, sediment traps, and so forth) for the site (SWPPP, Erosion and Sediment Control Plan)?

Provide information and location of sedimentation traps and basins (SWPPP, Erosion and Sediment Control Plan)? Calculate the size based upon complete retention of the 2-year 24-hour storm per EPA regulations (the EPA has a formula for a 3,600 cubic feet/acre of site to simplify but for Utah this is greater than complete retention of the 100-year 24-hour storm in most places)? Calculations do not need to be shown on the SWPPP.

Identify the contractors and subcontractors that will implement the structural practices (SWPPP)?

Identify stormwater management measures to address stormwater runoff once the construction is completed (detention, retention, velocity dissipation, structural treatment, permanent landscaping, pavement, curb and gutter and other post-construction controls, SWPPP, Grading and Drainage Plan)?

Inspections:

Conduct inspections at a minimum of bi-weekly and within 24 hours of 0.5 inches of rain or greater event (SWPPP)?

Inspection reports are to be signed by the Owner, contractor, and inspector (Inspection Form - Erosion and Sediment Control Plan)?

Provide the qualifications of the inspector? Currently no formal training is specified by regulation or practice (Inspection Form – Erosion and Sediment Control Plan)

# ATTACHMENT B – BASIC EPA SAMPLE CONCEPT SWPPP REVIEW TEMPLATE

**Review with current EPA requirements**

|  |  |
| --- | --- |
| Property Name | Contractor Name |
| Property Number | Contractor Representative Name |
| Property Address | Contractor Address |
| Submittal Date Review Date Reviewed By | |

References are given from both the Small MS4 General UPDES Permit (section 4.2) and the Construction General Permit (section 3.5).

1-SWPPP Document (4.2.4.3.1)

Site Description

* Nature of activity or project – 3.5.1.a

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* Intended sequence of major soil disturbing activities – 3.5.1.b

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* Total area of site, area to be disturbed – 3.5.1.c

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* Runoff coefficient – 3.5.1.d
  + Pre-construction \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Post-construction

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* General location map – 3.5.1.e
  + Existing drainage patterns and slopes
  + Final drainage patterns and slopes
  + Construction boundaries
  + Existing vegetation description
  + Areas of soil disturbance
  + Areas of no soil disturbance
  + BMP locations
  + Off-site areas used for construction support (may be non-applicable)
  + Final stabilization treatment
  + Discharge locations
* Description and location of discharges associated with off-site facilities (portable asphalt or concrete plants, stockpile areas, etc.) – 3.5.1.f

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* Name and location of receiving waters – 3.5.1.g

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* Area and boundary of any associated wetlands (may be non-applicable) – 3.5.1.g
* Copy of the current General Permit for Construction Activities

Erosion and Sediment Controls – 3.5.2.a.1

* Control measures for each major soil disturbing activity
  + Activity

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* + Control Measure to be used \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Timing  
    \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Installation details
  + Anticipated maintenance requirements

Stabilization Practices – 3.5.2.a.2

* Site specific stabilization
  + Interim stabilization practices – including timing
  + Permanent stabilization practices – including timing

Structural Controls – 3.5.2.a.3

* Flow control
  + Description of flow diversion BMPs

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* + Description of flow storage BMPs

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* + If site is 10 acres or more – Sediment basin required
    - Basin sized for 3,600 cf/acre or 10-yr 24-hour storm

Post-Construction BMPs – 3.5.2.b

* Description of how pollutants are controlled after construction. (i.e., permanent detention or retention basins, flow attenuation swales, infiltration, combination of BMPs, etc.)

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* Technical basis for selecting post-construction BMPs

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* Velocity dissipation devices at discharge points (as necessary)

Other Controls – 3.5.2.c

* Waste Disposal – location and practices to control
* Off-Site Tracking – off-site tracking and dust control
* Septic, Waste and Sanitary Sewer Disposal – location and practices to control
* Vehicle/Equip. maintenance areas and controls.
* Exposure to construction materials – inventory, storage practices, locations, spill response, and practices to control
* Off-site support area controls (if applicable)

Maintenance – 3.5.3

* Maintenance requirements and schedules
* Maintenance Agreements

Non-Stormwater Discharges – 3.5.5

* Identify non-stormwater discharges that may be associated with project (water used to clean or flush improvements, etc.)

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* Describe measures to be taken to implement pollution prevention for non-stormwater discharges

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Inspections – 3.5.4

* Inspection requirements (at least once every 7 days, or once every 14 days and within 24 hours after a storm of 0.5 inches or greater)
* Qualifications of the inspector
* Linear project inspection requirements (0.25 miles above and below each access point)
* Inspection report forms
  + Inspection date
  + Name, title, and qualifications of inspector
  + Weather information since last inspection
  + Current weather information
  + Locations of pollutant discharges
  + Locations of BMPs needing maintenance
  + Locations of BMPs that are not working
  + Locations where additional BMPs are needed
  + Any corrective actions that may be required, including changes that need to be made to the SWPPP – with implementation dates
* Requirements to keep records as part of SWPPP for at least 5 years.

II – Water Quality Review (4.2.4.3.2)

* Urban Pollutants of Concern
  + Sediments
  + Nutrients (phosphorus, Nitrogen…)
  + Metals
  + Hydrocarbons/oils
  + Pesticides
  + Chlorides
  + Trash and Debris
  + Bacteria
  + Organics matter
  + Others

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Consider options to include water quality aspects to this project.
* Identify any highly impacted areas.
* Identify and limit directly connected impervious areas (DCIA) on this project.
* Identify measures to minimize runoff.

III – Low Impact Development Design (4.2.4.3.3)

* Identify any low-impact development concepts and ideas that might work for this project. Consider the following LID Techniques:
  + Bio-Retention Areas
  + Green Roof
  + Permeable Pavements
  + Rainwater Collection
  + Riparian Buffers
  + Green Street System
  + Non-Structural

IV – Sensitive Areas (4.2.4.3.4) (3.5.2.d)

List any of the following within the proximity:

* Impaired water bodies
* High Quality Waters
* TMDL
* Wetlands
* Wildlife issues (Threatened & Endangered Species)
* Historic
* Priority Construction sites (7.36)

Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_