Appendix S-0: Suggested Implementation for All Site and Water Guidelines

This document is intended to offer guidance on the issues to consider throughout the planning, design, construction and operation processes to help achieve and improve on the performance for each guideline. This document is optional and is not a checklist to insure compliance. See the guidelines sections to identify specific requirements and any time-sensitive deadlines for those requirements.

S.1 Avoidance of Critical Sites

Agency Planning

- Determine ideal spatial needs for existing or new development.

Predesign-Programming

- Identify critical sites for preservation or restoration on the project site, as defined the Guidelines.
- Determine what type of buildings and related infrastructure will be required for the developed areas and their spatial requirements.
- Begin to allocate broad spatial footprints for the developed sites while preserving the critical sites identified during the predesign phase.

Schematic Design through Construction Documents

- Develop site plans and details that preserve, protect, and/or enhance critical sites within the project area.

Construction

- Hold a pre-construction meeting to identify requirements for protection/preservation of critical sites during and after the construction process.

Ongoing Occupancy and Next use

- Consider developing easements for critical sites that will preserve those sites beyond the life of the project.

S.2 Stormwater Management

Agency Planning

- Seek direction from Local Government Unit or authority having jurisdiction over the project's stormwater management. Understand applicable rules, regulations, and permitting requirements.

Predesign-Programming

- Perform a topographic, utility, boundary, and wetland surveys, as applicable.
- Identify areas on-site where the site conditions and topography will facilitate stormwater management.Identify areas on-site where the site conditions do not allow for stormwater treatment or infiltration, such as groundwater recharge areas or karst topography.

- Perform a geotechnical analysis of the site to determine soil types, infiltration rates, and areas best suited for stormwater management.

Schematic Design

- Complete general calculations to estimate the volume of stormwater that will need to be treated on-site per the Guideline requirements. Identify stormwater management techniques that are appropriate for the amount and type of stormwater generated by the developed site.

Design Development through Construction Documents

- Finalize stormwater calculations to determine the volume of stormwater that will need to be treated on-site per the Guideline requirements.
- Develop details and specifications for the stormwater management techniques identified for the project and size the techniques based on the stormwater calculations.

Construction Administration

- Monitor submittals for compliance with plans and details.
- Make bidders aware of specific requirements for stormwater management.

Construction

- Hold a pre-construction meeting to identify requirements for the construction of stormwater management areas and for protection during and after the construction process.
- Construct stormwater management features in a sustainable manner, according to drawings and specifications.

Ongoing Occupancy and Next Use

- Develop an Operations and Maintenance manual for the ongoing care of the stormwater management arreas.
- Maintain stormwater management areas per the Operations and Maintenance manual.
- Maintain as-built records of stormwater systems.
- Monitor the stormwater management techniques and record the performance data.

S.3 Soil Management

Schematic Design through Construction Documents

- Develop a soil management plan to prevent erosion, maintain and protect topsoil, amend soil, and provide adequate soil rooting volume to grow large, healthy trees per the Guideline requirements.

Construction Administration

- Monitor submittals for compliance with plans and details.
- Design Team shall observe that performance criteria of the soil management plan are being met.

Construction

- Hold a pre-construction meeting to identify requirements for protection, preservation, and enhancement of site soil during and after the construction process.
- Implement practices to meet performance criteria according to the drawings and specifications.

Correction Period

- Confirm successful implementation of performance criteria

S.4 Sustainable Vegetation Design

Predesign-Site Selection

- Select a site where the proposed building and infrastructure will have minimal disturbance on the existing vegetation and the supporting soil and hydrologic conditions that support it.

Schematic Design through Construction Documents

- Identify areas of vegetation or high-quality areas for restoration that will be protected or restored during the design and construction process.
- Integrate techniques that minimize negative impacts on soil, water, and vegetation on the site and adjacent sites that are to be preserved or restored.
- Develop details and specifications that support the use of native plantings, maintain existing biodiversity, and promote enhancement of site conditions per the Guidelines.

Construction Administration

- Monitor submittals for compliance with plans and details.
- Make bidders aware of specific responsibilities for integrating the on-site vegetation management with connections to vegetation on adjacent sites.

Construction

- Hold a pre-construction meeting to identify requirements for protection/preservation of vegetation during and after the construction process.
- Protect existing plants and trees indicated to remain and maintain or improve soil and water conditions to promote and improve vegetation growth.

Ongoing Occupancy

- Create an Operation and Maintenance manual to protect and maintain the vegetation on-site.

Next Use

- Document the existing condition of the vegetation, the reason why it was preserved or enhanced, and its ability to function in its current capacity. Note what enhancements, and enlargements or reductions in spatial area would be needed to accommodate a different building type in the future.

S.5 Light Pollution Reduction

Schematic Design

- Define zones that require high, medium, and low levels of lighting based safety, security, and environmental concerns. Take into consideration existing nighttime ambient lighting levels.

Design Development

- Develop coverage patterns of lighting and design of light fixtures in relation to the scale of the development and the need for light or safety. Focus on enhancing way-finding, increasing safety, and minimizing glare and light trespass. increase wayfinding, and minimize light trespass at site periphery.

Construction Documents

- Develop site lighting that:
  - Adds and directs light only where it is required.
  - Is efficient in its use of energy.
  - Maximizes safety and minimizes light trespass.

Construction Administration

- Monitor submittals for compliance with plans and details.
- Make bidders aware that plans are diagrammatic; adjustments will need to be made when installing lighting in.

Construction

- Install site lighting upright and plumb, with correct fixtures and attachments.
- Test lighting for correct coverage pattern and color rendition.

Ongoing Occupancy

- Monitor and maintain vegetation around lighting to keep it from obscuring light coverage pattern.
- Clean/replace light lenses at regular intervals.

Next Use

- Study existing site lighting to see if the light poles could be re-used for future projects.

S.6 Erosion and Sedimentation Control During Construction

Agency Planning

- Seek direction from Local Government Unit or authority having jurisdiction over the project's erosion and sedimentation control. Understand applicable rules, regulations, and permitting requirements.

Predesign-Site Selection

- Determine soil type, soil structure, and limitations of soil, by performing a detailed geotechnical analysis.

Schematic Design through Construction Documents

- Determine what types of erosion and sedimentation control measures are appropriate for the specific types of soils on the site.
- Develop drawings and specifications that protect soil, water and utilities form erosion and sedimentation.

Construction Administration

- Monitor submittals for compliance with plans and details.

- Hold a pre-construction meeting to identify requirements for sediment control during and after the construction process.
- Coordinate with contractors to ensure correct application of erosion and sedimentation controls and necessary modifications.

Construction

- Maintain temporary erosion control until the site is fully vegetated and stabilized and the stormwater management techniques are fully functional and online.

Ongoing Occupancy

- Create an Operations and Management manual that requires at least inspections and necessary maintenance of the site and stormwater management areas for erosion and sedimentation.

S.7 Landscape Water Efficiency

Schematic Design

- Evaluate the site for existing natural features for water capture and vegetated areas that require low water input.
- Define areas of different plant communities based water input requirements. Identify opportunities for water harvest and reuse.
- Perform general calculations for water consumption and identify available sources for the water.

Design Development

- Select native and water-efficient plant communities based on the community's location, slope, soil and hydrologic regime.
- Finalize calculations for water consumption needs and sources of the water.
- Develop details and specifications for irrigation, water harvest, and water re-use systems.

Construction Documents

- Finalize the plant list for the various plant communities by their ability to perform given their location, natural hydrologic regime, and water input.
- Finalize details and specifications for irrigation, water harvest, and water re-use.
- Consider requiring a first and second year maintenance program to ensure establishment of plant communities, which will enable them to continue to perform, once established, with the designed level of water and chemical inputs.

Construction Administration

- Monitor submittals for compliance with plans and details.
- Make bidders aware of specific requirements for landscape water efficiency and maintenance requirements.

Construction

- Hold a pre-construction meeting to identify requirements for landscape water efficiency and maintenance requirements.

Ongoing Occupancy

- Create an Operation and Maintenance manual to protect and maintain the plant material and the irrigation from potable and non-potable sources used on the site.

S.8 Building Water Efficiency

Agency Planning

- Develop a water efficiency improvement goal per the guideline requirements.

Predesign-Programming

- Adapt the water efficiency goal and document it in the program

Schematic Design

- Communicate the water efficiency goal to all design team members. The goal shall also be documented in the schematic design submittals.

Design Development

- Document the water efficiency goal in the design development submittal.
- Provide annual water use calculations showing the reduction in water use compared to code. Use the total daily water requirements from the Minnesota Plumbing Code and the Energy Policy Act the basis of the calculations.

Construction Documents

- Clearly indicate the water efficiency goal in the construction documents.
- Confirm or revise calculations from the design development phase.
- Specify appropriate fixtures.

Construction Administration

- Review submittals and verify compliance with specifications.
- Confirm installation on site.

Ongoing Occupancy

- Repair or replace plumbing fixtures with equal or improved water use performance.

S.9 Appropriate Location and Development Pattern

Predesign-Site Selection

- Seek out and evaluate opportunities to locate development in areas where existing infrastructure will support increased densities and where additional development can improve site use.
- Work with local government units and community representatives to inventory potential sites that will enhance environmental and economic performance for communities and agencies alike.
- Choose to develop a site where community revitalization is occurring, provided the required development density is achieved by the project's completion.

- Integrate community feedback into density development proposals, working closely with municipalities to coordinate development efforts.
- Document development density goals.

Schematic Design through Construction Documents

- Maximize use of existing infrastructure and target maximum development densities appropriate to the site.

Construction Administration

- Make bidders aware of specific requirements for sustainable development.

S.10 Brownfield Redevelopment

Agency Planning

- Seek direction from Local Government Unit or authority having jurisdiction over the project's brownfield redevelopment. Understand their rules, regulations, and permitting requirements.
- In planning for new facilities, include the Brownfield redevelopment option, based on its ability to meet expectations of key locations, appropriate size, and sufficient infrastructure to support planning goals.

Predesign-Programming

- Select a building approach that is adaptable to Brownfield redevelopment.

Predesign-Site Selection

- Preferably, select a site that is eligible for the EPA's Brownfield Redevelopment program.

S.11 Heat Island Reduction

Predesign-Site Selection

- Consider sites where existing vegetation or site features provide shading that can be integrated into the built area.
- Evaluate effects of maturing plantings or changing uses on future heat island effects.
- Consider sharing building space or amenities, such as parking, to minimize the development footprint and surfaces that promote the heat island effect.

Schematic Design through Construction Documents

- Preserve or propose landscape features that provide shade for surfaces that contribute to the heat island effect.
- Orient the building and pavement surfaces that maximize shade for surfaces that contribute to the heat island effect.
- Minimize building and pavement surfaces that are exposed to the sun.
- Consider replacing impervious surfaces (i.e. roofs, sidewalks, roads, driving lanes, etc.) with open grid paving or high albedo materials.
- Consider replacing roofing surfaces with high albedo materials or vegetated surfaces.

Construction Administration

- Monitor submittals for compliance with plans and details. Make bidders aware of specific requirements for heat island reduction.

Construction

- Install site or plant features as designed.

Ongoing Occupancy

- Monitor and maintain vegetation around site to preserve its beneficial effects and mitigate negative developments.

Next Use

Study existing site shading to see if additional plantings may be necessary to maintain or increase benefits.

S.12 Transportation Impacts Reduction

Agency Planning

- Perform a transportation survey of future building occupants to identify transportation opportunities and needs.
- Determine number of vehicle trips per square foot of building and equate that to amount of CO2 produced or 'reduced' over a one year life cycle by providing alternative transportation methods and monitor their use.

Predesign-Programming

- Include transportation amenities such as bicycle racks and showering/changing facilities, alternative fuel refueling stations in the building and site program.

Predesign-Site Selection

- Seek location accessible to two or more bus lines or a light rail station and within walking distance of retail and public services. Also consider sites that offer the possibility of sharing transportation facilities such as parking lots and refueling stations with neighboring developments.

Schematic Design through Construction Documents

- Size parking capacity not to exceed minimum local zoning requirements. Add no new parking for rehabilitation projects.
- Provide preferred parking for carpools, van pools, plug in electric or hybrid vehicles. Design to encourage use by occupants with clearly marked carpool parking, pick-up areas, and covered waiting spaces within close proximity of the building entrance.
- Design means for securing bicycles, with convenient changing/shower facilities for use by cyclists.
- Liquid or gaseous fueling facilities must be separately ventilated or located outdoors.
- Enhance the design hybrid/carpool/vanpool parking to encourage its use by occupants.
- Create and conveniently locate plug in electric charging stations conveniently to encourage its use by occupants.
- Develop specifications and drawings to support bicyclists, pedestrians and mass transit/carpool members.

Next Use

- Evaluate if existing transportation alternatives support next use. Maintain and improve them where possible (including connections to new trailways or transportation opportunities.)

S.13 Wastewater Reduction and Management

Agency Planning

- Seek direction from Local Government Unit or authority having jurisdiction on which water utility districts in the local community are stressed and will be impacted by this development.
- Engage the water authority about alternative proposals of graywater treatment, in order to streamline the approval process.

Predesign-Programming

- Consider ways to reduce blackwater going to the municipal wastewater system or on-site conventional septic system.Note that reduction of building water consumption also contributes to reduced waste water generated.
- Consider ways to use graywater for non-potable water uses such as irrigation, toilets, vehicle washing, sewage transport, HVAC/process make-up water, etc. Determine whether gray water or biological wastewater treatment systems are appropriate based on program and activities within the building and on the site. If so, develop goals and objectives for gray water reclamation or biological treatment.
- Develop specific programming criteria and standards for biological waste treatment.

Predesign-Site Selection

- In areas not served by a public waste treatment facility, select a site that can accommodate approved exterior biological waste treatment systems such as peat moss, drain fields, treatment wetlands, etc.

Schematic Design through Construction Documentation.

- Evaluate availability of potential storage and treatment areas on the site.
- Research and analyze systems early in the design process to ensure successful and effective design solutions.
- Evaluate requirements for permits and/or variances.
- Develop appropriate design strategies and select appropriate systems based on program, occupants, and site.
- Research and implement best available alternative waste treatment fixtures and technologies.
- If considering constructed wetland systems, identify design requirements based on users, capacity, pollutants to be removed from water, area, and detention time necessary for thorough treatment, vegetation and aquatic life survival requirements, and aesthetics.

Design Development

- Where biological wastewater treatment systems are under consideration, evaluate savings incurred from minimized amount of piping required because of reduced volume of wastewater.
- Select and design appropriate treatment system based on site and building determinants.

Construction Administration

- Monitor submittals for compliance with plans and details.
- Make bidders aware of specific requirements for heat island reduction.

Construction Documents

- Specify type of system, or multiple systems, selected for the site and building. Specify the type of storage area that is most applicable for the project.

Correction Period

- Educate occupants and operations staff about biological wastewater treatment strategies and systems.
- Perform appropriate testing.

Ongoing Occupancy

- Create an Operations and Management manual that requires inspections and necessary maintenance of the wastewater systems.

Next Use

- Determine whether existing systems are appropriate for next use.

S.14 Bird-Safe Building

Predesign-Site Selection

- If the building use is likely to be associated with large glazed areas, consider increased risk/adjustments needed on highly vegetated sites.
- Consider an ecological assessment of the site that includes an evaluation of bird species and habitat.

Schematic Design

- Identify attractant areas for birds on the site, plan deterrents for facades adjacent to attractants and keep glazed areas of buildings greater than fifty feet away from them.
- Configure building to minimize bird collision “traps.” “Traps” can include clear barriers, transparent railings or other glazed see-through conditions. See guideline for complete conditions deemed to be “traps.”
- Evaluate early designs through the Bird-Safe Calculator (Appendix S-14a) to inform and adjust design to meet bird-safe criteria.

Design Development

- Check design against bird-safe criteria and update the WBTF in the bird-safe building calculator to confirm it still complies
- Incorporate bird safe first year monitoring into the commissioning plan
- Incorporate Lights Out program criteria into the operations commissioning plan
- Coordinate with lighting engineer regarding controls for lights to accommodate Lights Out program compliance
- If pursuing Bird-Safe Case Study narrative, coordinate with lighting engineer on documentation of lighting benefits anticipated from Lights out program.
- If pursuing S.5 B and S.5 C under S.5 Light Pollution, consider documentation of bird-safe features for S.14 J Bird Safe Lighting Design

Construction Documents

- Confirm continued compliance with all required and pursued recommended bird-safe criteria, adjusting documentation and design as needed.
- Confirm that contract documents include those features needed for bird-safe compliance, as calculated using the Bird-Safe Calculator (Appendix S-14a).

Construction Administration

- Make bidders aware of specific requirements for sustainable construction according to B3 Guidelines.
- Watch for substitutions that would change the bird-safe performance of the building.

Construction

- Construct features affecting bird-safe design, according to drawings and specifications.

Correction Period

- Confirm correct implementation of features affecting bird-safe performance according to drawings and specifications.
- Comply with Lights Out Management Program during relevant seasons according to the guidelines.
- Perform required first year bird-safe monitoring

Ongoing Occupancy

- Comply with Lights Out Management Program during relevant seasons according to the guidelines.
- Perform any recommended ongoing monitoring that was pursued, using appendix S-14a for First Year Building Monitoring.