**SCA Integrative Design Process Facilitator Guide & Agenda**

Beginning in pre-design and continuing throughout the design phases, identify and use opportunities to achieve synergies across disciplines and building systems. Use the analyses and workshop described in this guide to inform the project design, provide integrative design strategies to SCA, and support ongoing performance and operations.

The Integrative Design Process is required for all projects and must be completed in the Pre-Schematic design phase of the project. The Integrative Design Process should be conducted prior to final scheme selection. This process prioritizes cost-effective solutions over both the short and long terms. Teams should plan for early and active participation, input, and analysis from all disciplines to discover the beneficial interrelationships and synergies between systems and components. An effective integrative design process can improve decision making, achieve high levels of building performance, improved learning and teaching environments, and lead to significant environmental benefits.

The Integrative Design Process outlines a process for completing the early-phase analysis of energy and water systems, assessing acoustical strategies, analysis of unique building envelope assemblies, daylighting opportunities, building life-cycle assessment, and active design. The Integrative Design Process also outlines the procedures for facilitating an IDP Workshop to present and synthesize the team’s analysis and assessment, and developing an IDP Workshop Report that summarizes the integrative potential and goals for the project. This process will require team members from various disciplines to meet and discuss the project goals, opportunities, and risks both from the perspective of their respective disciplines AND the perspective of the whole project and its end users. Project teams are encouraged to take ownership of and improve the Integrative Design Process to effectively identify and evaluate synergistic opportunities and benefits.

The following pages outline a process for incorporating integrative design into the design process.

**IDP WORKSHOP**

The project team will identify a moderator (Sustainability Consultant/LEED AP BD+C) to serve as the Facilitator to lead an Integrative Design workshop during the Pre-Schematic phase, prior to final scheme selection. The IDP Workshop shall be conducted prior to final scheme selection.

Preparation, workshop and follow up should include the following:

**Before the IDP Workshop:**

* Prepare a preliminary agenda with activity durations and list of participants distributed at least two days prior to the workshop.

* Engage SCA in workshop planning and agenda development.
* Assigned discipline lead shall prepare synopsis of each discovery analysis and send to the SCA at least 3 days before the workshop.

*Analyses will be covered in detail in the next section.*

* Prepare summary presentation of studies and analyses results including the questions they raised, to present at the workshop.
* Review the SCA energy modeling templates and guidelines on the SCA website.

Project design team to coordinate printing and distribution of workshop report and any other materials. Minimize printing materials. Limited copies of material will be available during the workshop.

Discipline leads such as acoustical consultant, energy modeler, sustainability consultant, AOR and EOR must attend workshop. Attendance of other consultants should be coordinated with DPM.

**During the IDP Workshop:**

* Facilitate workshop to identify, clarify, and evaluate integrative design opportunities. Facilitator to provide visual aids to facilitate the discussion (powerpoint, sticky notes, easel, whiteboard, paper, pads, markers, etc.)

* Listen to and synthesize SCA and Design Team responses to identified challenges, opportunities, and next steps.
* Designate a team member to take meeting minutes during the workshop. Include comments, suggestions, and recommendations and identify the party making the comment.

**After the IDP Workshop:**

* Within 2 weeks of the IDP Workshop, summarize potential strategies and follow up actions required, along with responsible parties for each, into an Integrative Design Workshop Report including:
  + - All analysis completed and included.
    - Meeting minutes from workshop.
    - Integrative design narrative with stated energy and water goals.
    - Design impacts that may inform scheme selection.
    - Report with results and design impacts after workshop.
    - Narrative outlining strategy for meeting SCA standards and local law.
    - Preliminary GSG checklist and credit impacts of strategies evaluated.

*The required documentation for each analysis is outlined in the last section of this guide.*

**ANALYSIS OVERVIEW**

**Discovery #1 - Energy Analysis**

Perform a preliminary energy analysis before the completion of Schematic Design that explores how to reduce energy loads in the school and accomplish related sustainability goals by questioning default assumptions. Analyze and assess strategies associated with ALL of the following:

*Energy Use*

* + - Establish a 60 Source EUI performance target.

*Site Conditions*

Assess:

* + - Site shading

Orient the building to take advantage of maximum natural daylighting: plot shadow patterns from surrounding buildings to optimize access to daylight.

* + - Adjcent Site Conditions, Landscaping, Exterior Lighting

Adjacent Site Conditions: Take advantage of existing built environment conditions and vegetation to provide shelter from extreme weather or to deflect unwanted noise. Take into account any unique site features that may impact building energy usage.

Landscaping: Plant or protect deciduous trees to block summer sun and allow winter solar gain. Planting should be an adequate distance from the building to prevent the accumulation of water along the building envelope.

Exterior Lighting: Note any exterior lighting that may impact energy usage of the building, i.e. safety/security lighting, field lighting, parking lighting.

*Massing, Envelope, and Façade elements*

Assess how massing,envelope and façade elements affect the scheme design, including but not limited to:

|  |  |
| --- | --- |
| * Energy consumption * Daylighting * Glazing location on a particular orientation * PV system configuration | * HVAC sizing * Window to wall ratio * Views * Massing |

*Load Reduction Strategies*

Evaluate load reduction strategies for lighting levels, plug and process loads, and programmatic and operational parameters.

Evaluate HVAC load uses in the IDP Box Model Summary spreadsheet, selecting Option 1 or Option 2.

Compare the HVAC load change to the WWR sensitivity analysis.

*MEP Layout Optimization*

* + - Develop a best solution to optimize the MEP design.
    - Develop an alternate solution to optimize the MEP design.
    - Determine the modifications to the Architectural system to meet the HVAC optimization goals.
    - Geothermal Screening Tool
    - Per Local Law 94 of 2019, indicate sustainable roofing zone on roof plan, including all calculations. Provide analysis stating whether solar PV electricity generating system and/or green roof system is selected (consider shading, adjacent conditions, etc).

*Renewable Energy Analysis*

* + - Complete an assessment of on-site renewable energy potential as required by Local Law 31 of 2016. Use the PVWatts Calculator to assist with the assessment (refer to the [Renewable Energy Feasibility](http://nycsca.org/Design/NYC-Green-Schools-Guide#GSG-Reference-Materials-154) templates for calculator inputs).
    - Consider equipment location (maximize roof space for renewable infrastructure, while managing equipment location) and shading (for example, impact on solar panels).

*Discovery # 1 References/IDP Workshop Deliverables*

The following deliverables are located on the SCA website in the NYC Green Schools Guide section. Refer to the [GSG Reference Materials](http://www.nycsca.org/Design/NYC-Green-Schools-Guide#GSG-Reference-Materials-154) tab and IDP Toolkit subtab. These deliverables are to be included in the IDP report and completed for review during the workshop:

* IDP Box Model Information Summary
* IDP Box Model Instructions (eQuest)
* IDP Discovery 1 Summary
* IDP Presubmission – Site Shading
* New York City Geothermal Pre-feasibility Tool Geothermal Pre-feasibility ToolGeothermal Pre-feasibility Tool: <https://www1.nyc.gov/assets/ddc/geothermal/index.html>

**Discovery #2 - Water-Related Systems**

Perform a preliminary water budget analysis before the completion of schematic design that explores how to reduce potable water loads in the building and accomplish related sustainability goals. Assess the project’s potential non-potable water supply sources and estimate water demand volumes, including the following:

*Supply sources*

* + - Assess and quantify all potential non-potable water supply sources, such as on-site rainwater, graywater, and HVAC equipment condensate.

*Annual Water Demand Analysis*

* + - Calculate annual water demands for building; match with potential supply sources.
    - Use the Green Schools Guide Indoor Water Use Reduction Credit Form to guide calculations.

*Cost Impact*

* + - Analyze potential cost impact associated with installing any water conserving systems other than SCA standard.

*Green Infrastructure*

* + - Discuss potential locations for green infrastructure.

**Discovery #3 - Preliminary Life-Cycle Impacts Assessment (LCA)**

Perform a preliminary Life Cycle Assessment by quantifying the embodied carbon and other environmental impacts of the project using the SCA LCA Discovery Tool. This tool will help project teams analyze standard SCA materials and assemblies. Include tool results and conclusions in the IDP Workshop Report.

*Discovery # 3 References/IDP Workshop Deliverables*

The following deliverable is located on the SCA website in the NYC Green Schools Guide Section. Refer to the [GSG Reference Materials](http://www.nycsca.org/Design/NYC-Green-Schools-Guide#GSG-Reference-Materials-154) tab and IDP Toolkit subtab:

* + - SCA LCA Discovery Tool

Analyze a minimum of (2) façade schemes.

**Discovery #4 - Active Design**

Complete a Schematic Active Design Plan that identifies and locates all the potential Active Design strategies that can be implemented on the project for each scheme. Refer to Active Design in a School Environment (I2.1A) for a list of potential strategies. Indicate whether each strategy listed below has been considered.

*Discovery # 4 References/IDP Workshop Deliverables*

The following deliverable is located on the SCA website in the NYC Green Schools Guide Section. Refer to the [GSG Reference Materials](http://www.nycsca.org/Design/NYC-Green-Schools-Guide#GSG-Reference-Materials-154) tab and IDP Toolkit subtab:

* + - IDP Active Design

**Discovery #5 - Acoustics**

Review the requirements for the Minimum (Q8.1P) and Enhanced Acoustics (Q8.2) credits and identify risks to achieving each credit. Bring a list of potential risks to the IDP workshop to discuss and address, such as acoustical considerations for programmatic adjacencies, spaces that may need special acoustical treatment to mitigate sound transmission, exterior and interior noise levels, etc. A preliminary acoustical report or narrative detailing acoustical considerations can be provided.

**Discovery #6 – Climate Resiliency**

Review the latest published version of the NYC Climate Resiliency Design Guidelines (CRDG) from the Mayor’s Office of Recovery and Resiliency.

Identify all applicable climate hazards using the Exposure Screening Tool and complete the design strategies checklist for potential mitigation of risks.

<https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/CRDG-4-1-May-2022.pdf>

Use FEMA data and the NYC Flood Hazard Mapper (<http://www.nyc.gov/floodhazardmapper>) to assess flood zones and sea level rise for the school building location including High Tide and Future Floodplain maps (2020s, 2050s, 2080s and 2100), based on the expected useful life of the building. Determine if the predicted flood level or sea level may affect the programming for cellar/basement levels, mechanical and other critical/operational systems location, or requirement for additional square footage above the flood level.

Based on the future years scenario range:

* Apply the CRDG projected Sea Level Rise adjustment to the recommended Design Flood

Elevation, perform a basic risk assessment, and determine whether the design should be adjusted.

* In conjunction with S2.3P, S2.4 – Green Infrastructure Assessment and Rainwater Management, apply the CRDG projected rainfall intensity adjustment to the stormwater flow rate and volume following NYC DEP methodology, perform a basic risk assessment, to determine the design of the project’s stormwater measures.
* In conjunction with S2.5 – Heat Island Reduction, apply the CRDG projected heating degree day and cooling degree day adjustments to the project’s mechanical load calculations, (Credit E3.3R HVAC system Sizing, Avoid Oversizing) perform a basic risk assessment, meet the Climate Zone 6 standard for fenestration and insulation, (Credit E3.2R – Optimize Energy Performance).

*Discovery # 6 References/IDP Workshop Deliverables*

The following IDP Workshop Deliverables are located on the SCA website in the NYC Green Schools Guide Section. Refer to the [GSG Reference Materials](http://www.nycsca.org/Design/NYC-Green-Schools-Guide#GSG-Reference-Materials-154) tab and Climate Resiliency Design Guide subtab:

* + - Climate Resiliency Design Guidelines-Design Strategies Checklist
    - Climate Resiliency Design Guidelines-Exposure Screening Tool

**IDP WORKSHOP AGENDA**

The agenda and duration of the IDP Workshop should follow the below format, but be adjusted accordingly for each project and coordinated with the GSG Review Committee. The agenda below has been provided as a helpful guide for setting up the IDP Workshop.

**IDP OVERVIEW AND INTENT: 8:30am – 8:45am**

**Introduction of Team Members and Project Overview**

1. Integrated Design Process Overview and Intent
2. Bring all disciplines together beginning in the pre-design phase and continuing throughout the design phases
3. Use input from teams to identify cost effective and resource efficient solutions
4. Execute strategies to save resources over both the short and long terms

**EARLY DESIGN ANALYSIS: 8:45am – 10:45am**

1. Energy, Water, LCA Discoveries
2. Discovery #1: Energy Analysis (45 min)
3. Discuss performance target as described in credit E3.2 - Optimize Energy Performance.
4. Discuss site conditions: site shading, exterior lighting, landscaping, and adjacent site conditions.
5. Discuss how massing, envelope and façade elements affect energy consumption, daylighting, glazing location, PV system configuration, HVAC sizing, window to wall ratio, views and massing
6. Provide results of the New York City Geothermal Pre-feasibility Tool Geothermal Pre-feasibility ToolGeothermal Pre-feasibility Tool.
7. Discuss assessment of on-site renewable energy potential as required by local law.
8. Discuss best and alternate solutions to optimize the MEP design and determine the modifications to the Architectural system to meet the HVAC optimization goals.
9. Discovery #2: Water-Related Systems (15 min)
10. Discuss all potential nonpotable water supply sources, such as on-site rainwater, graywater, and HVAC equipment condensate.
11. Discuss Annual Water Demand Analysis
12. Discuss potential cost impact associated with installing any water conserving systems other than SCA standard.
13. Discuss potential locations for green infrastructure.
14. Discovery #3: Preliminary Life-cycle Impacts Assessment (LCA) (15 min)
15. Discuss preliminary Life-Cycle Assessment by reviewing the results of the SCA LCA Discovery Tool and resulting design considerations in the IDP Workshop Report.
16. Active Design, Acoustics, Climate Resiliency Discoveries
17. Discovery #4: Active Design (10 min)
18. Discuss Schematic Active Design Plan.
19. Consider the stairs, youth/adult recreation space, and indoor exercise equipment specifications. Which of these could be complicated by SCA codes or practices? Discuss best practices or strategies to avoid for these components of active design.
20. Consider focusing on improving health options for neighbors. Is the recreation space freely accessible to the public? How could the space better facilitate neighborhood wellness?
21. Discovery #5: Acoustics (15 min)
22. Discuss the list of potential risks to achieving Minimum (Q8.1P) and Enhanced Acoustics (Q8.2).
23. Discovery #6 Climate Resiliency (20 min)
    * 1. Review maps, exposure screening tool and design strategies checklist.
      2. Discuss any Medium or High results from the exposure screening tool.
      3. Discuss any impact on programming, green infrastructure,mechanical loads, fenestration design, as applicable.

**WRAP UP: 10:45am – 11:00am**

1. IDP Workshop Report
   1. Identify responsible parties
   2. Summarize potential strategies
   3. Identify follow up actions required

**IDP WORKSHOP REPORT**

Complete an Integrative Design Workshop Report that includes the following:

**Report - Energy Analysis**

* + Document how the energy analysis has informed the building design, location of building on site, MEP systems, and energy use. Include the following, as applicable:
    - Building and site program
    - Building form and site layout
    - Building envelope and façade elements impact on different orientations
    - Building envelope materials selection
    - Modification to, or significant downsizing of building systems (e.g., HVAC, lighting, controls)
    - Modifications to exterior materials, interior finishes, and other systems
    - New York City Geothermal Pre-feasibility Tool results
    - Roof plan with sustainable roofing zone per LL 94 of 2019, including all calculations and analysis indicating whether solar PV electricity generating system and/or green roof system is selected.

**Report - Water Systems**

* + Document how the water budget analysis informed building and site design decisions and the systems outlined below. Demonstrate how at least one on-site nonpotable water supply source was analyzed to reduce the burden on the NYC municipal supply or wastewater treatment systems. Include the following, as applicable:
    - Monthly and annual rainfall volume landing on site and building roof
    - Monthly and annual site and building water use
    - Indoor Water Use Reduction Credit Form
    - Rainwater quantity and quality management systems
    - Landscaping, irrigation, and site elements
    - Roofing systems and/or building form and geometry
    - Potential locations for green infrastructure
    - Other systems

**Report - Preliminary Life-Cycle Assessment**

* + Document the LCA considerations impacts of SCA materials and assemblies selected for the project including the following:
    - LCA environmental impacts for each assembly selected using the SCA LCA Discovery Tool
    - LCA environmental impacts for any assemblies that were considered and not selected with brief summary of why each assembly was not selected
    - LCA considerations in selection of building envelope assemblies

**Report - Active Design**

* + Update the Schematic Active Design Plan to include the following:
    - First floor plan for each scheme with all potential Active Design strategies identified and located
    - IDP Active Design form completed with all potential Active Design Strategies for each scheme identified
    - Narrative summarizing design strategies that help the project meet the intent of I2.1A.

**Report - Acoustics**

* + Complete a preliminary acoustics narrative summarizing potential risks to achieving the Minimum (Q8.1P) and Enhanced Acoustics (Q8.2) credits, decision made in the IDP Workshop, and proposed strategies for addressing the risks.

**Report – Climate Resiliency**

* + Provide a Climate Resiliency narrative assessing considerations for the project. Include the following documents:
    - Provide results of CRDG Exposure Screening Tool
    - Provide completed CRDG Design Strategies Checklist
    - Provide maps of flood zones and sea level rise present and predicted for the school building location, including High Tide and Future Floodplain maps for the 2020s, 2050s, 2080s and 2100 (see NYC Flood Hazard Mapper tool).
    - If the project budget is more than $50 million and scores “Medium” or “High” in Heat, Precipitation, or Sea level rise, provide a list of recommendations for modifications to the current design to address the triggered climate risk. Include an order of magnitude cost for each recommended measure. If the project budget is less than $50 million, If project budget is less than $50 million and scores "Medium" or "High" in the Heat category, consult Section II. A, B, C in the Guidelines and consider modifications to the current design to address the triggered climate risk.