PROJECT NAME

PROPOSED LIBRARY DEVELOPMENT IN BROOKLYN NY

PROJECT DESCRIPTION

Brief description
Site Area
Proposed Floor Area
Proposed Solar Area
Number of Proposed Cisterns
Number of Stair Cores
LEED 4.1 Compliance

DRAWING LIST

1.0 LOCAL CONTEXT SOLAR SHADING STUDY

Solar Parti Diagram

Create solar parti diagram based on analysis of the effect of site context buildings on a massing study of your project.

Target Benchmark

Define some solar goal, like “create even winter daylighting throughout,” “maximize (or minimize?) solar heat gain on south façade”, etc.

1.1 LOCAL CONTEXT SOLAR SHADING STUDY

Shading Study

A brief description of what the Site Analysis “shading study” in Climate Studio is showing.

Baseline Design

Project massing placed on site.

1.2 LOCAL CONTEXT SOLAR SHADING STUDY

Optimized Design

Based on analysis of context shading, change siting or form of massing toward defined benchmark.

Shading Effect Analyzed

Used trimmed site model and zoom in on site so that the effect of shadings on massing are clear.

2.0 SITING: RADIATION AND WIND

Outdoor Room

Show rationale for placement of an occupied outdoor space (for example a living roof) in your design.

Target Benchmark

Define a solar/wind exposure goal for the space in question, for example "comfortable year round"

2.2 SITING: (BPS) RADIATION AND WIND

Radiation Map

Climate Studio radiation map and wind rose studies.

Wind Rose

Climate Studio radiation map and wind rose studies.

2.3 SITING: (BPS) RADIATION AND WIND

Baseline Design: Radiation Map / Wind Rose

Radiation map/wind rose showing of baseline position of outdoor space in question in massing (or later) geometry of project.

Optimized Design: Radiation Map / Wind Rose

Rotated, shaded or otherwise altered configuration of outdoor space; radiation map quantifies improvement toward your defined benchmark condition.

3.0 CODE COMPLIANT STAIR CORES

Stair Core Locations

Illustrate that your fire stairs meet code. Show as an isolated view.

Target Benchmark

IBC code specifications for your primary occupancy type.

3.1 CODE COMPLIANT STAIR CORES

Optimized Design

Provide a simple table with the IBC specifications used in the GH script.

Stair Core Pictorial View

Show the stair core volumes laid out in a massing of your design.

4.0 LBC ZERO WATER RESOURCE COMPLIANT CISTERN DESIGN

Pictorial View of Cistern(s)

Size and place rain catchment cisterns that meet project program specifications.

Target Benchmark

Living Building Challenge (LBC) Imperative 06: Net Positive Water

4.1 LBC ZERO WATER RESOURCE COMPLIANT CISTERN DESIGN

Baseline Design

Run the GH script using the surfaces (roofs, portions of roofs, ground) that you want to use areas for collection of precipitation.

Optimized Design

Size and place cisterns needed to collect enough water on site to meet the benchmark. Lay the cisterns out sensible based on some concept of how the water will drain off of the given roof, wall, or ground surface.

5.0 LEED 4.1 OPTION 1 DAYLIGHT AVAILABILITY COMPLIANT DESIGN

Target Benchmark

Deliver a design with sufficient daylighting for occupant health and building energy efficiency without causing discomfort through excessive glare.

(1) Earn 3 points in the LEED 4.1, Option 1 Daylight Availability credit; no space should require blinds for more than 25% of the occupied hours. [Note: We have covered this standard in class, but If you do not understand how it works: ASK! There is no point running a simulation toward a benchmark that you do not understand.];

5.0 LEED 4.1 OPTION 1 DAYLIGHT AVAILABILITY COMPLIANT DESIGN

Baseline Design

Start with all of your glazing set to single pane “Starphire” with a Vt of 91% and remove any shading that you might have added specifically to fix daylighting issues; Set opaque materials to match your chosen envelope (concrete, wood, etc.)

Optimized Design

Iterate your baseline to meet the benchmark. Your options: reduce amount of glazing, change glazing Vt of glazing, change reflectance of your opaque materials (try it: can make a big difference), add exterior shading (overhangs, awnings, balconies, planted facades, etc.) and/or interior light shelves, add top-lighting (tubular skylights).

6.0 TASK SPECIFIC TARGET LUX ELECTRIC LIGHTING DESIGN

Target Benchmark

Design electric lighting for at least on space that will be used at night.

Choose a target lux based on space use (chart provided in EX7).

Point in Time Illuminance simulation in Climate Studio, set to any day at an hour during the night.

Optimized Design

If the space is also used during the day, your baseline is your optimized daylighting design.

Lighting placed to meet target lux on worksurfaces appropriate to given space use. Provide table of luminaires chosen with their lumen outputs and light dispersal patterns included.

7.0 NYC LL97 2050 COMPLIANT CARBON FOOTPRINT

Target Benchmark

A design that meets contemporary standards for low energy, low carbon design.

NYC Local Law 97 for 2050.

Climate Studio thermal analysis, provided Grasshopper PV and natural ventilation schedules scripts, provided LL97 compliance spreadsheet.

Baseline Design

Start with your optimized daylighting design as the baseline geometry and glazing types; start with all thermal zones set the same; use provided “ARCH 413 baseline zone space use” and “ARCH 413 baseline construction” templates; choose “VAV” mechanical system and leave the default settings. Run a Climate Studio thermal analysis simulation.

7.1 NYC LL97 2050 COMPLIANT CARBON FOOTPRINT

Optimized Design

A design that meets contemporary standards for low energy, low carbon design. Iterate this baseline to meet the benchmark.

7.1 NYC LL97 2050 COMPLIANT CARBON FOOTPRINT

Space Use and Construction Optimization:

Options based on review of “energy flows” chart: increase R-values of opaque envelope assemblies, change SHGC and/or U-value of glazing (if you do this you will need to rerun your daylighting simulation to make sure you are still meeting that benchmark), reduce air infiltration, reduce lighting and equipment power densities, etc. An efficient way to make these changes is to start with 90.1 Templates for your project type. If you use provided templates rather than making your own, you still need to compare energy flows charts from your baseline sim to identify what caused the improvement. If you can, tweak settings from there to further optimize, then do so.

HVAC Optimization

Most likely, the baseline VAV system will be the least efficient. Try the DOAS with fan coils and the DOAS with VRF systems. If you choose one of these, identify what changed in the energy flow chart to make this system more efficient.

7.2 NYC LL97 2050 COMPLIANT CARBON FOOTPRINT

Natural Ventilation and Photovoltaic Production:
Site EUI Reduction

These workflows are accomplished without changing geometry or any specifications of physical building components. We will do these together as a demo in class in WK13.vv

LL97 Compliance

his benchmark is based on the operational carbon footprint that is one of the outputs in the Climate Studio thermal analysis sim. It also takes into consideration your potential PV production on site. This analysis is also accomplished without changing geometry or any specifications of physical building components. We will demo this process in class in WK13.

8.0 APPENDIX

Additional Notes

Additional notes