DAYLIGHTING GUIDE FOR THE COMMERCIAL OFFICE

This document contains examples of daylighting design for interior architecture. Case studies highlight key concepts including programming, space planning, window covering design, workstation panel design, interior surface finishes, and integration of electric lighting and controls.

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TEAM & OVERVIEW

PROJECT TEAM

• Interior Design: IA Interior Architects
• Lighting Design: Lightfield
• Electrical/Mechanical Engineering: Clifford Dias
• General Contractor: Gannon-Vittolo

OVERVIEW

• 8,000 sq ft renovation
• 8th floor downtown New York City
• Northern & Western exposures
• No adjacent buildings to the North
• Neighboring building across the street to the West
• Design supports flexibility & innovation
• No enclosed offices; “phone booth” rooms offer privacy
• Formal and informal meeting areas to encourage collaboration
• Daylight important to areas where staff spend most of their day – Open Office

• Direct sun on computer screens or worksurfaces was not desirable

• Desk “benching” layout without workstation panels supports daylighting programming

• Primary visual field (computer screens) oriented perpendicular to Western sun entering space
WINDOW COVERING DESIGN

- Window shades selected to maintain view outside when shades are down

- Shades have 5% openness factor

- Shades installed on all North side windows
  - Create privacy in evening/late afternoon in Winter
  - Minimize glare off of adjacent buildings during day

- Shades installed on all West side windows

A Western exposure windows. No direct sun on work surfaces. Shades up.

B Computer screens perpendicular to daylight distribution. Shades partially down
INTERIOR SURFACE FINISHES

- Light interior finishes, those with high Light Reflectance Values, maximize the efficiency of lighting (daylight and electric) throughout the space.

- Power of the sun is maximized to light the space.

- 98” high windows & high light reflectance values on finishes bounce daylight far into the space.

- Windows don’t appear as bright spots when the brightness of the adjacent space is balanced.

DIRECTIONAL STUDIES

Balanced brightness at exterior windows.

Electric lighting is used to compliment daylight and balance brightness throughout the space.
TEAM & OVERVIEW

PROJECT TEAM
- Interior Design: IA Interior Architects
- Lighting Design: Studio Lumen
- Electrical: Sparling & Valley Electric
- Mechanical: Holaday-Parks
- Contractor: Lease Crutcher Lewis

OVERVIEW
- Need to accommodate rapid growth and constant change in company
- Staff interviews to develop a deep understanding of culture and needs
- Master planning to create a flexible, modular planning concept
- Moveable wall and spine system allows for rapid reconfiguration
- Circulation is efficient and less disruptive by separating concentrative work areas from interactive, shared space
- Furniture reuse
WORKSTATION PANEL DESIGN

- The lowest, 48" high, workstation panels are oriented perpendicular to daylight distribution.

- 62" high panels create a spine for greater visual privacy & more surface area for markerboard and tack.

- Ceiling height panels always maintain a clear glass “clerestory” above 7’-0”
  - Still allows some daylight into the space.

Corporate Headquarters, SEATTLE, WA

Staff with less need for privacy maximize shared daylight and views.
ELECTRICAL LIGHTING CONTROLS

- Ceiling mounted fixtures minimized
  - Continuous dimming in daylighting zone
- User-controlled task lights maximized
- Maximized energy efficiency
  - Occupancy sensors integral to task light = rebate from local utility
  - Light only where needed = rebate from local utility
  - Vacancy sensors in conference rooms & offices

Lighting Control Zones Per Program Requirements
- Lighting Control Zone – Continuous Dimming Daylight Controls
- Lighting Control Zone – Daylight Zone with Photocell, Continuous Dimming, Manual Switch On, Vacancy Sensor Off
- Task Lighting with Occupancy Sensor
- Work Station: 30-50FC
  - Occupant can control task light at work station, accommodating various tasks and personal preferences.
- Open Office Pathway: 10-15FC
  - Light distribution on floor, walls, and ceiling create the perception of a well-lit space.
- Common Corridors: 10-25FC
  - Central pathway requires minimal light, but wall washers at markerboards and accent lighting create interest.
ELECTRICAL LIGHTING CONTROLS

- Occupant education
  - Lighting scene controls
  - Fixtures dimming in daylight zone
  - After hours overrides

- Give purpose to design
  - Cost savings (lower utilities)
  - Minimize CO2 emissions
  - User control
  - Energy conservation

Lighting controls

Occupancy sensors on task lights

After Hours overrides
TEAM & OVERVIEW

PROJECT TEAM

Interior Design: IA Interior Architects
Lighting Design: JS Nolan & Associates
Daylighting: Loises+Ubbelohde
Graphics: Propp + Guerin
Architecture: Integrated Architecture
Landscape: Mesa Design Group
Electrical/Mechanical Engineering: GMB
Contractor: Owen-Ames-Kimball Company

OVERVIEW

- 80,000 sq ft, single story facility converted to office use
- Maximized daylight opportunity with skylights
- Skylight spacing and placement to ensure glare control within workspace
- Deep floor plate and limited opportunities for views encouraged use of ‘plantscaping’ to bring outside inside

From the entry doors through the middle of the building, a “green belt” allows large groups of people to pass freely. Private spaces are screened by custom designed plant walls that can be reconfigured as workgroups move.
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<td>Use of skylights key to creating pleasant work environment</td>
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<td>Toplighting tends to provide the most effective daylight performance, since it typically avoids the direct sunlight associated with perimeter windows</td>
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<td>Skylights are sized to 2% of the floor area</td>
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<td>Electric lighting design compliments the toplighting layout to maximize daylight opportunities</td>
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**Herman Miller, ZEELAND, MI**

![Floor Plan](image)

![Office Images](image)
- Depth of floor plate challenging; Use of skylights was critical in providing cues to the outdoors
- Main Street planning concept
- Hubs of activity along Main Street
Herman Miller conducted employee surveys post occupancy. Overall 88% say that the changes made were positive.

- 90% say that the changes to their physical environment allow them to get their work done more effectively, a 17% increase.

- There was a 32% improvement in employee retention.

- 92% say that the office’s physical environment positively affects their job satisfaction, a rise of 30%.

- There was a 67% improvement in the overall satisfaction of individual workstations.

- 84% of employees felt that the new office was a quality work environment, as opposed to 31% in the prior space.
TEAM & OVERVIEW

PROJECT TEAM

- Interior Design: IA Interior Architects
- Lighting Design: JS Nolan & Associates
- Graphics: Propp + Guerin
- Electrical Engineering: Cochran Electric
- Mechanical Engineering: Hermanson
- Contractor: Turner Construction

Overview

- 2,100 employees, 14 stories, 350,000 sq ft corporate headquarters
- Open office workspace to maximize flexibility, collaboration and cost efficiency
- ‘Neighborhood’ open office areas have simple kit of parts, allowing furniture to be reconfigured
- Daylighting and view goals to provide as much daylight to the open office while maintaining a balance of interior and window private offices
- LEED CI Silver
PROGRAMMING FOR DAYLIGHTING

- Daylight and views important to staff in open office
- Office occupants are not in offices all day long
- Create a reason for people to have lunch in Kitchenettes so they don’t stay at desks all day – daylight & view can be a draw
- Target LEED Daylighting & Views credits for Commercial Interiors certification
  - Although dark tinting of exterior glass helped minimize heat loads, it was too dark to achieve Daylighting credit

Expedia Headquarters, BELLEVUE, WA

18’ deep into floor plate, window head height is 9’ in this space

Legend
- Daylight available, requires occupant control of glare
- Direct sunlight, requires occupant control of glare
- Minimal daylight penetration or view opportunities
- No daylight penetration or view opportunities
- Approximate daylight penetration (1.5x to 2x window head height)
- Zones of direct sun exposure in the Northern Hemisphere

Building across street is a few stories higher

View of green space & water

View to Mt. Rainier
SPACE PLANNING FOR DAYLIGHTING

- Perimeter offices located so as not to block all access to daylight for Open Office staff

- Private offices can be located on Eastern & Western exposures as occupants are likely to adjust window blinds during the day

- Kitchenette located on windows with view of Mt. Rainier

Expedia Headquarters, BELLEVUE, WA

Legend
- Daylight available, requires occupant control of glare
- Direct sunlight, requires occupant control of glare
- Minimal daylight penetration or view opportunities
- No daylight penetration or view opportunities
ELECTRIC LIGHTING INTEGRATION

- Average installed LPD for tenant spaces: 0.76 W/sf
- Functional control zones respond to the availability of daylighting
- Occupancy sensors located in enclosed spaces – estimated reduction of full lighting load by 10% during operating hours

Legend
- Lighting Control Zone – Daylighting, Continuous Dimming on Photocell
- Lighting Control Zone – Continuous Dimming
- Lighting Control Zones Per Program Requirements
FOR MORE INFORMATION

- www.algonline.org
- www.newbuildings.org
- www.integrateddesignlab.com
- www.interiorarchitects.com

DAYLIGHTING GUIDE FOR THE COMMERCIAL OFFICE

CHECKLIST ITEMS:

- Determine daylighting and view criteria for each program element.
- Do a site visit to understand the existing conditions during the hours of occupancy.
- Diagram out the daylighting and view opportunities on the floor plan.
- Align the program criteria for each space with the most desirable location on the floor plan.
- Select the appropriate window covering for the space. Privacy needs should be a consideration.
- Choose interior finishes that will support the maximum efficiency of electrical lighting and daylighting but also support balanced luminosity.
- Plan for open office workstation panels to be 42” or lower where they are parallel to the perimeter window.
- Integrate a lighting control system into the space. Zone areas with similar daylight performance together to help reduce electrical light output.