

CRYSTAL LAKE ELEMENTARY SCHOOL SCHEMATIC DESIGN



LEAH MATERN | AE SENIOR THESIS | LIGHTING/ELECTRICAL | DECEMBER 8, 2010

CRYSTAL LAKE ELEMENTARY SCHOOL

BUILDING INFORMATION

- LOCATION
 - LAKE MARY, FL
- PLOT SIZE
 - 11 ACRES
- BUILDING SIZE
 - 113, 927 SF
- USE
 - ELEMENTARY SCHOOL GRADES K-5
- COST
 - \$11,765,100



INTRODUCTION | COVERED ENTRY | LOBBY | CLASSROOM | MULTIPURPOSE ROOM

CRYSTAL LAKE ELEMENTARY SCHOOL

IMPORTANT DESIGN CONSIDERATIONS

- USED AS AN EDUCATION FACILITY
 - 780 STUDENT STATIONS
 - ADMINISTRATIVE OFFICES
 - MEDIA CENTER
 - MULTIPURPOSE ROOM
- USED AS AN EMERGENCY SHELTER
- USED AS A COMMUNITY ASSEMBLY SPACE



CRYSTAL LAKE ELEMENTARY SCHOOL

PROJECT TEAM

- OWNER : SEMINOLE COUNTY PUBLIC SCHOOLS
- ARCHITECT : SHENKEL SHULTZ
- CIVIL ENGINEER : KILMA WEEKS
- GENERAL CONTRACTOR: R.E. HARRIS CONSTRUCTION
- STRUCTURAL ENGINEER : BURTON, BRASWELL, MIDDLEBROOKS
- MEP ENGINEER : MPE, INC.

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CRYSTAL LAKE ELEMENTARY SCHOOL

DESIGN CONSIDERATIONS

- CREATE A WELCOMING ENTRANCE
- SMOOTH TRANSITION FROM EXTERIOR TO INTERIOR
- ENERGY EFFICIENCY DESIGN THROUGHOUT THE BUILDING
- LIGHTING DESIGN THAT ENHANCES THE LEARNING ENVIRONMENT
- CREATE THE IMPRESSION OF AN OPEN AND PUBLIC ENVIRONMENT

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DESIGN CRITERIA AND SCHEMATIC DESIGN IS DEVELOPED FOR:

- COVERED ENTRANCE AND COVERED WALKWAYS
- LOBBY
- PRIMARY CLASSROOM
- MULTIPURPOSE ROOM

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COVERED ENTRANCE AND COVERED WALKWAYS



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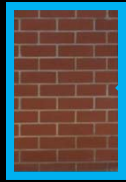
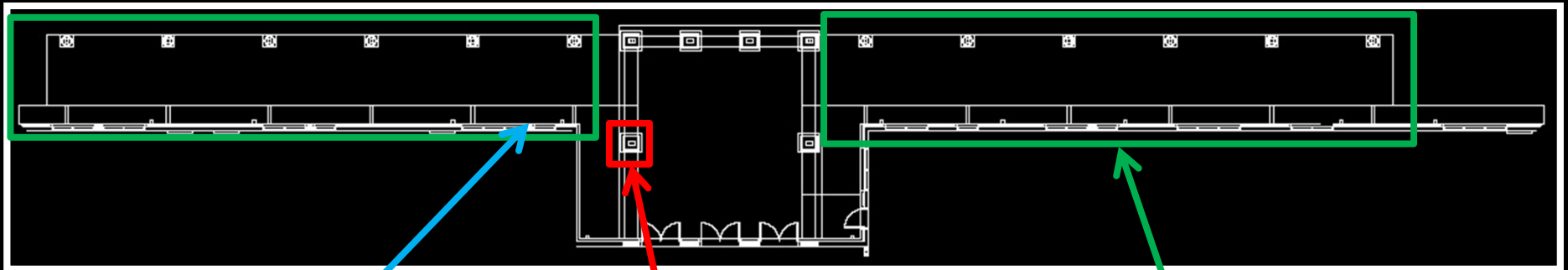
CRYSTAL LAKE ELEMENTARY SCHOOL

COVERED ENTRANCE AND COVERED WALKWAYS - DESIGN CRITERIA

- ENHANCE THE DESIGN AND ARCHITECTURE OF THE SPACE
- DIRECT PEOPLE TO THE ENTRANCE OF THE BUILDING
- MOLD FACES BY CREATING DEPTH, SHAPE, AND TEXTURE
- ENHANCE PERIPHERAL VISION TO DETECT ONCOMING THREATS
- CREATE VISUAL CLARITY

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MAIN DESIGN FEATURES



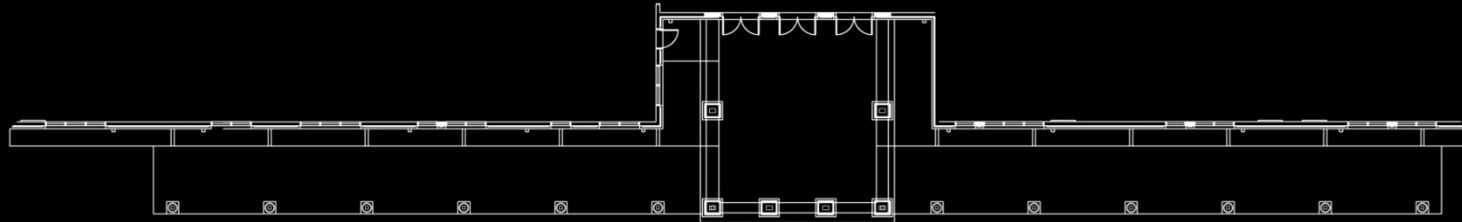
BRICK FAÇADE

ARCHITECTURAL COLUMNS

COVERED WALKWAYS

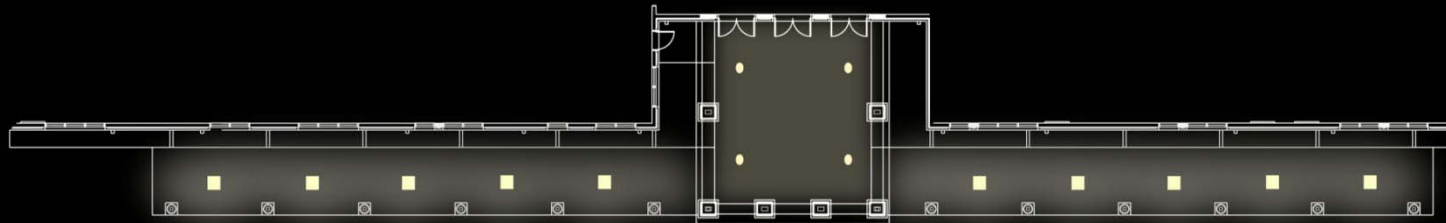
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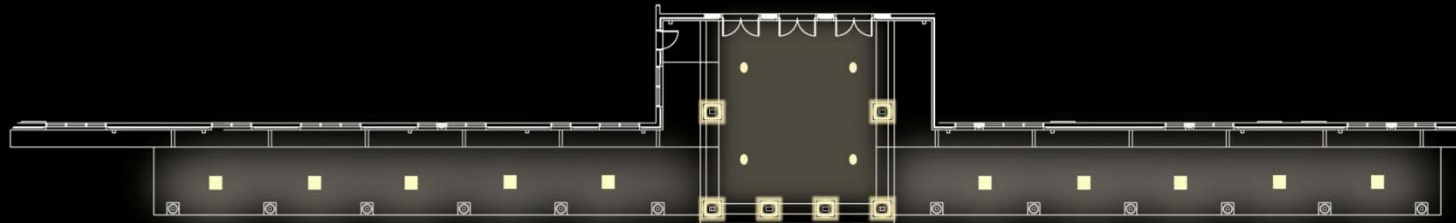
CRYSTAL LAKE ELEMENTARY SCHOOL



AMBIENT LIGHTING FOR COVERED
WALKWAY AND COVERED ENTRANCE

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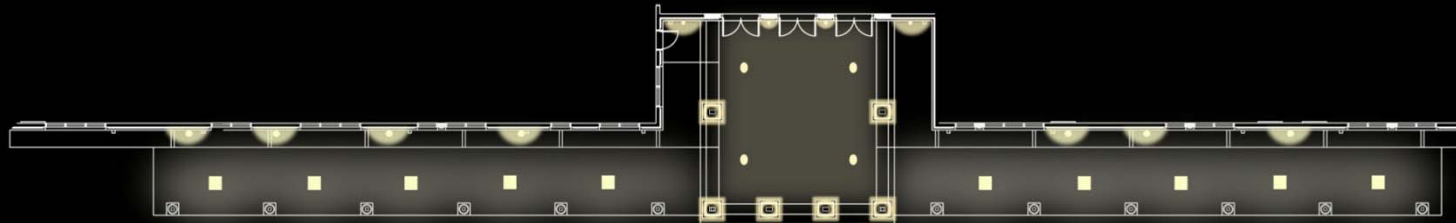
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WASH COLUMNS TO DRAW ATTENTION TO
ARCHITECTURAL FEATURE

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CRYSTAL LAKE ELEMENTARY SCHOOL



DIRECT/INDIRECT LIGHTING TO HIGHLIGHT BUILDING MATERIAL AND
PROVIDE ADDED LIGHTING FOR SCHOOL SECURITY

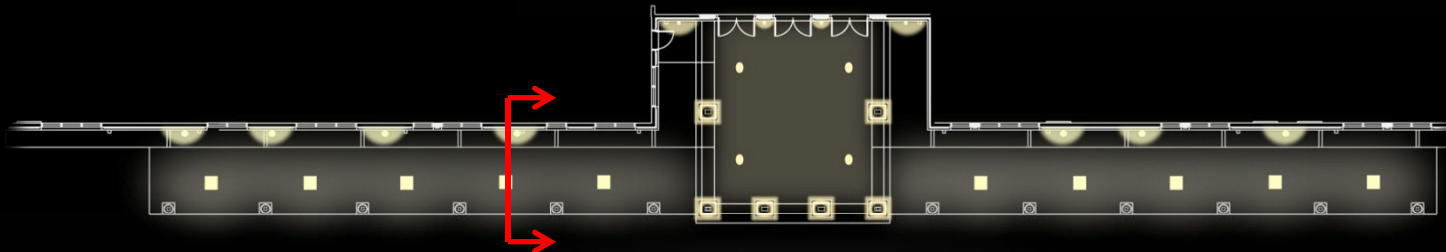
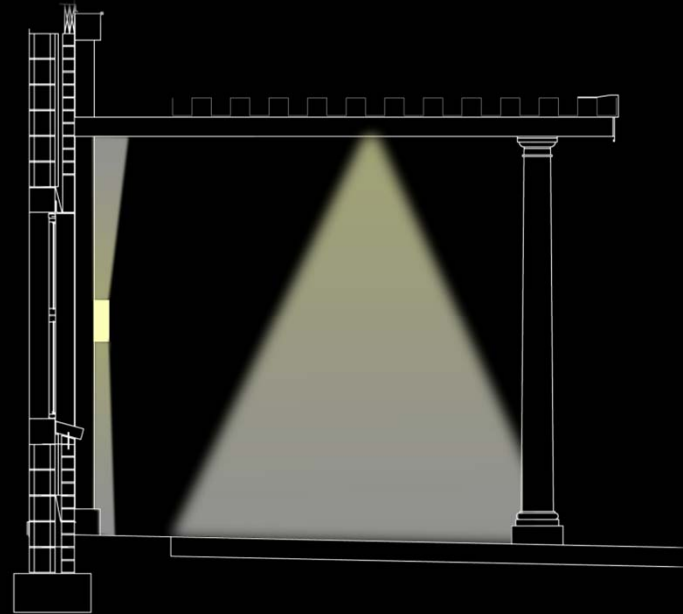
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CRYSTAL LAKE ELEMENTARY SCHOOL

AMBIENT LIGHT CREATED BY
RECTANGULAR CANOPY MOUNTED
LUMINAIRE



BUILDING MATERIAL HIGHLIGHTED BY
CIRCULAR WALL MOUNTED
DIRECT/INDIRECT LUMINAIRE



CRYSTAL LAKE ELEMENTARY SCHOOL

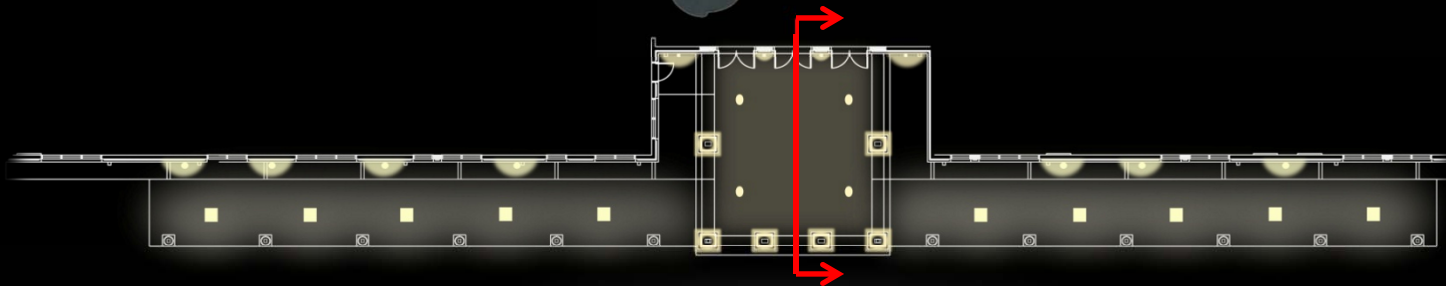
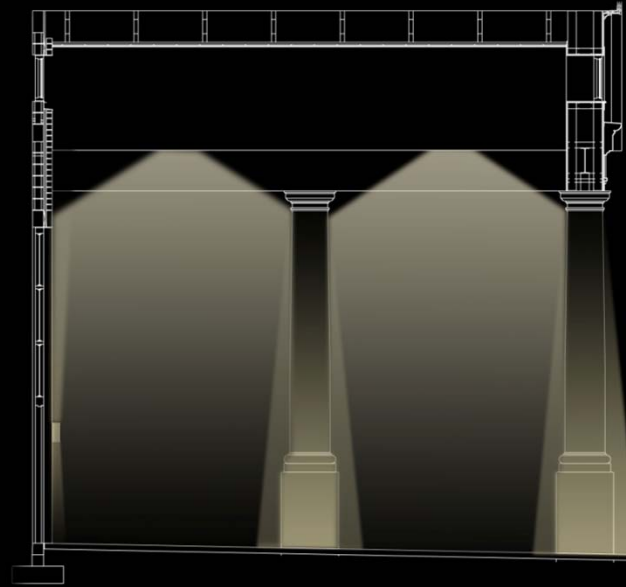
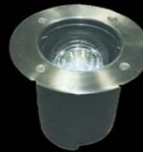
AMBIENT LIGHT CREATED BY
CIRCULAR RECESSED DOWNLIGHTS



BUILDING MATERIAL HIGHLIGHTED BY
CIRCULAR WALL MOUNTED
DIRECT/INDIRECT LUMINAIRE

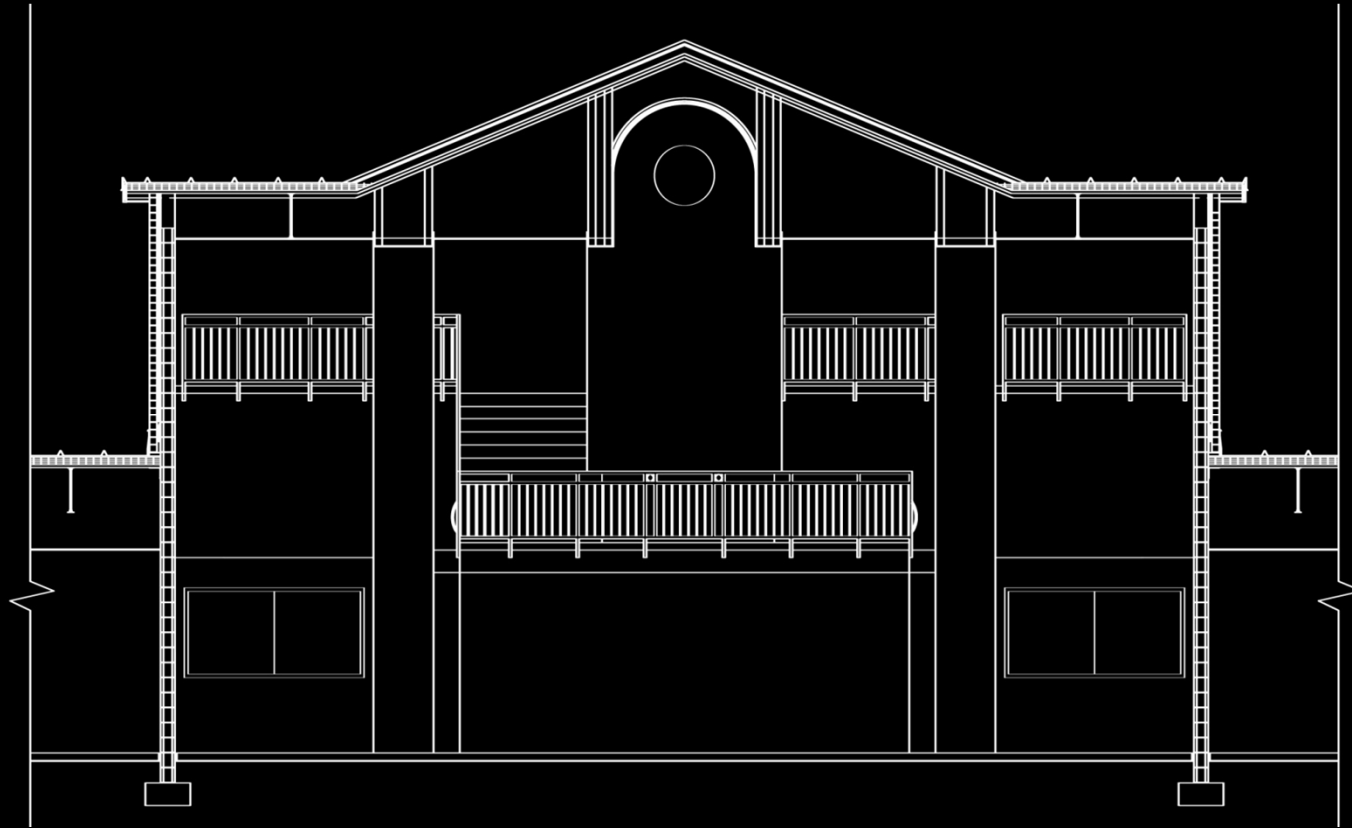


COLUMN HIGHLIGHTED BY
ADJUSTABLE IN-GRADE LUMINAIRE



CRYSTAL LAKE ELEMENTARY SCHOOL

LOBBY



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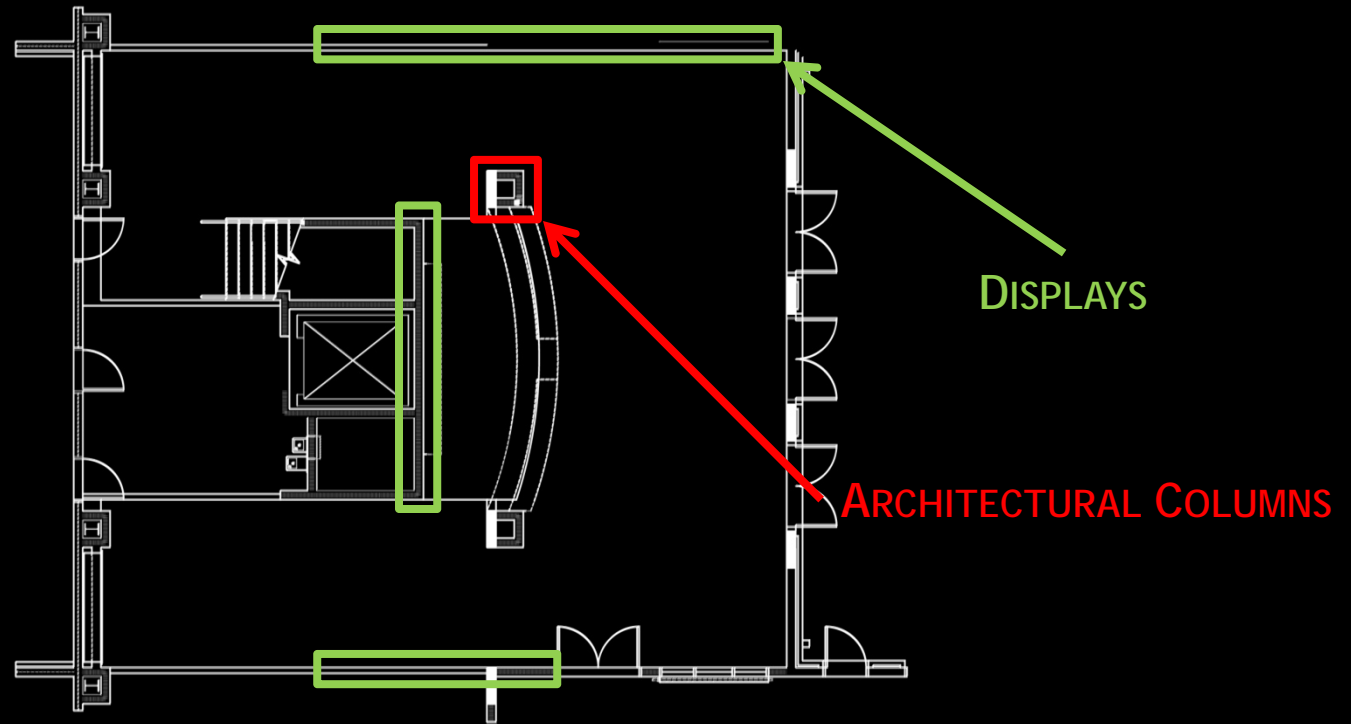
CRYSTAL LAKE ELEMENTARY SCHOOL

LOBBY - DESIGN CRITERIA

- CREATE A WELCOMING SPACE
- CREATE VISUAL INTERESTS AROUND THE PERIMETER
- AVOID DIRECT GLARE
- AVOID SHADOWS ON FLOOR SURFACE TO ASSIST SMOOTH CIRCULATION
- MINIMAL VARIATIONS IN BRIGHTNESS, BUT PURE UNIFORMITY SHOULD BE AVOIDED

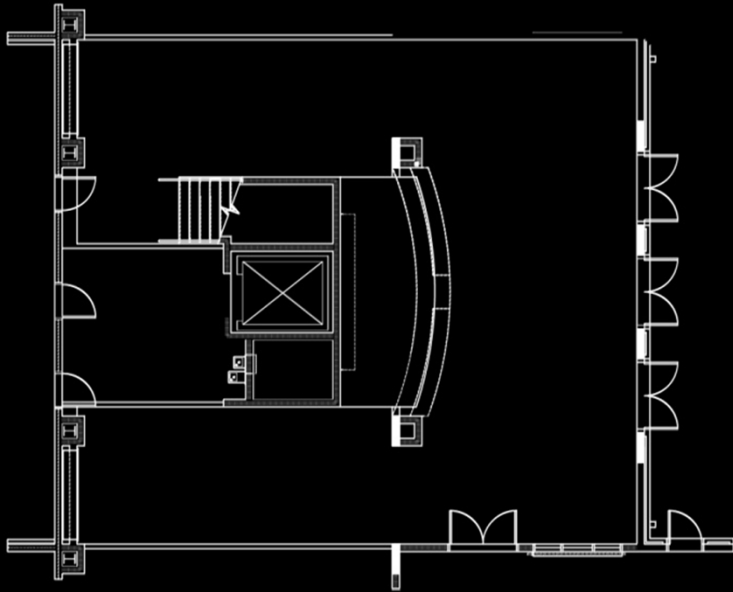
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MAIN DESIGN FEATURES



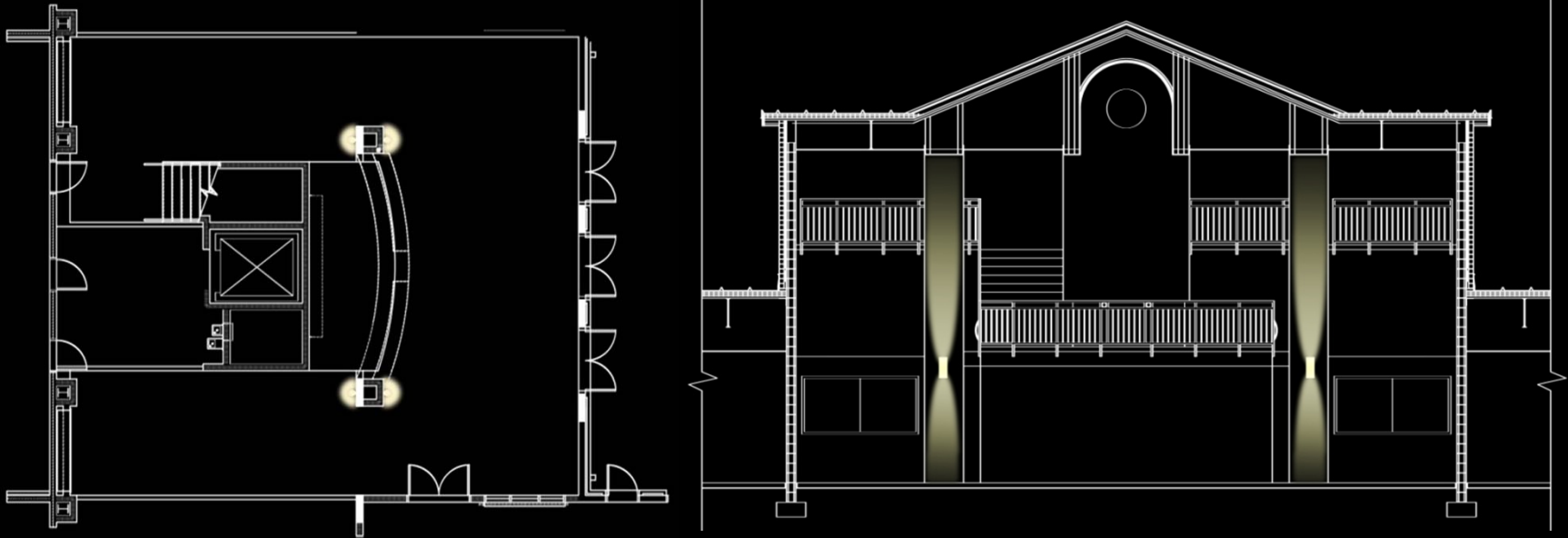
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DIRECT/INDIRECT LIGHTING TO HIGHLIGHT RECTANGULAR COLUMN AND
ACCENTUATE THE HEIGHT OF THE SPACE

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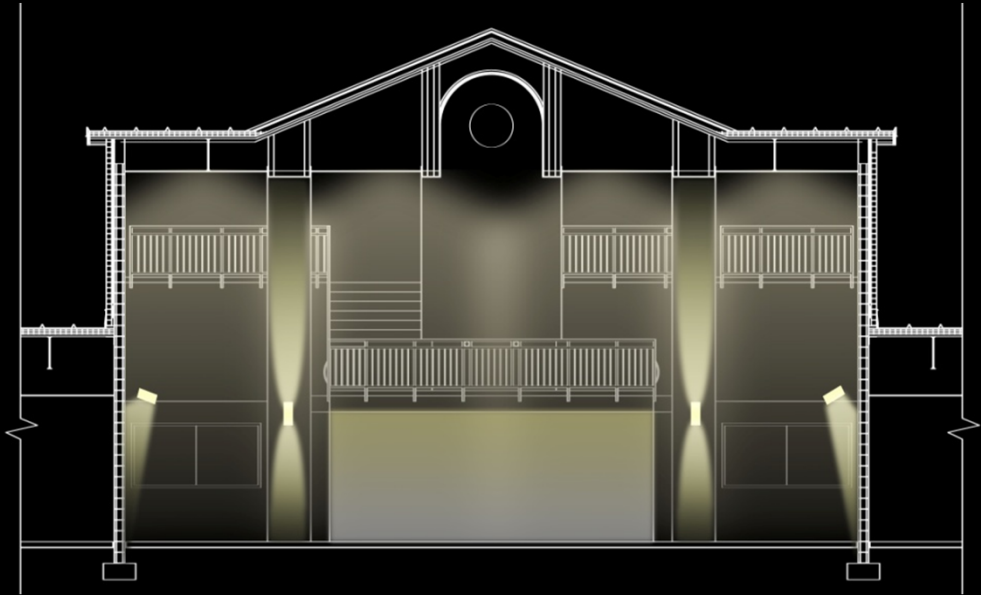
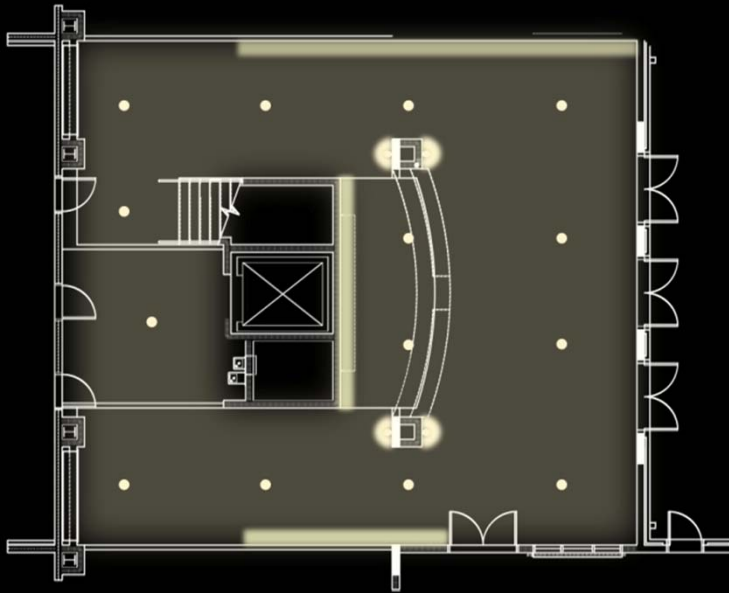
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WALL WASHING TO HIGHLIGHT THE PERIMETER
DISPLAY WALLS

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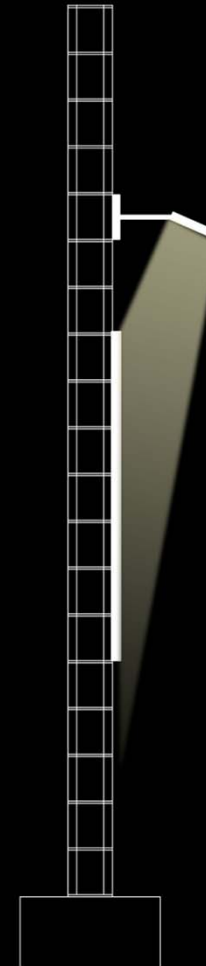
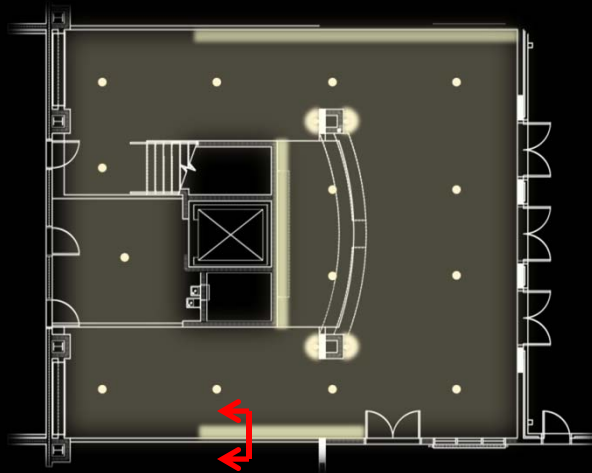


AMBIENT LIGHT TO PREVENT SHADOWS ON THE FLOOR

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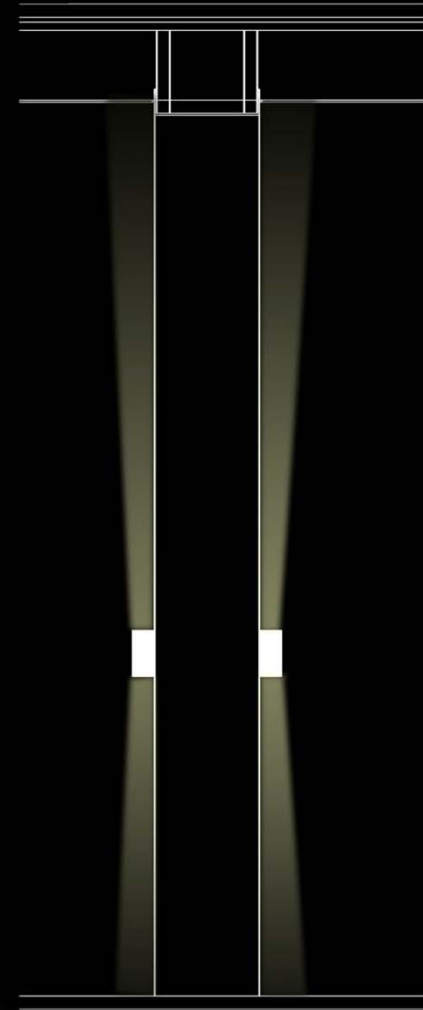
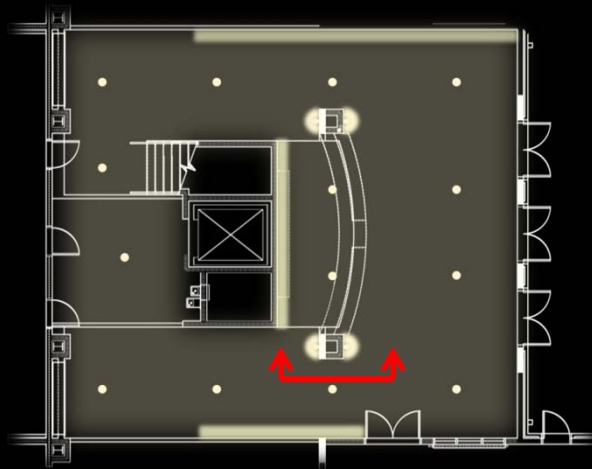
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WALL MOUNTED WALL WASHER TO
HIGHLIGHT WALL DISPLAYS



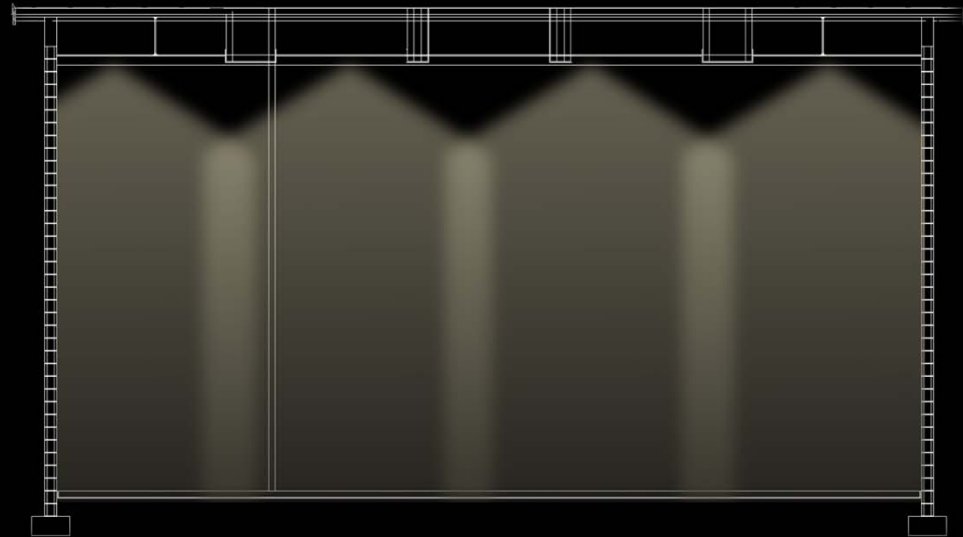
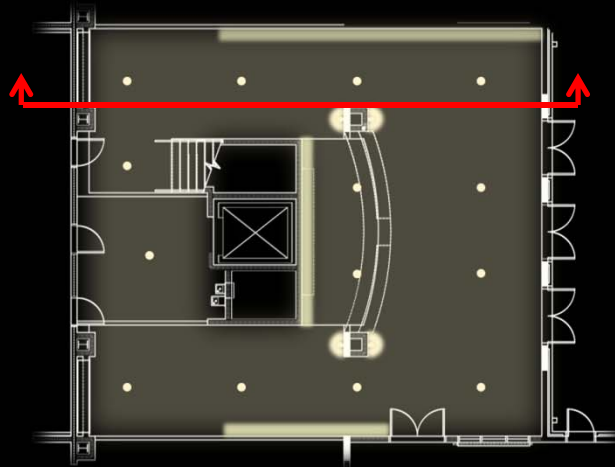
CRYSTAL LAKE ELEMENTARY SCHOOL

WALL MOUNTED DIRECT/INDIRECT
LUMINAIRE TO ACCENTUATE THE HEIGHT
OF THE ROOM



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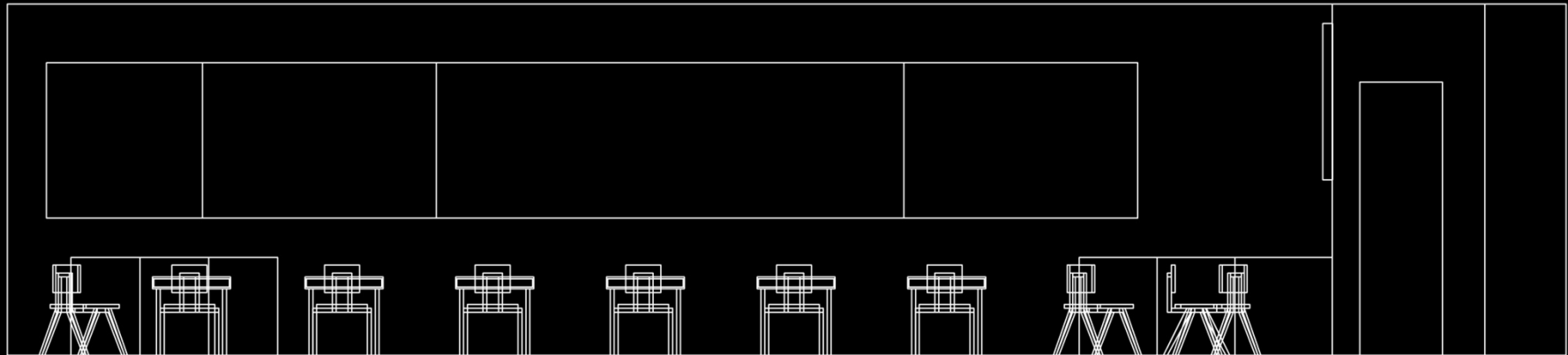
RECESSED DOWNLIGHTS FOR AMBIENT LIGHTING



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CRYSTAL LAKE ELEMENTARY SCHOOL

PRIMARY CLASSROOM



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CRYSTAL LAKE ELEMENTARY SCHOOL

PRIMARY CLASSROOM - DESIGN CRITERIA

- UNIFORMITY ON THE WORKPLANE SHOULD BE ACHIEVED
- UNIFORMITY ON WHITEBOARDS SHOULD BE ACHIEVED
- FOCUS DIRECTED TO FRONT OF ROOM
- AVOID GLARE
- AVOID CREATING SHADOWS

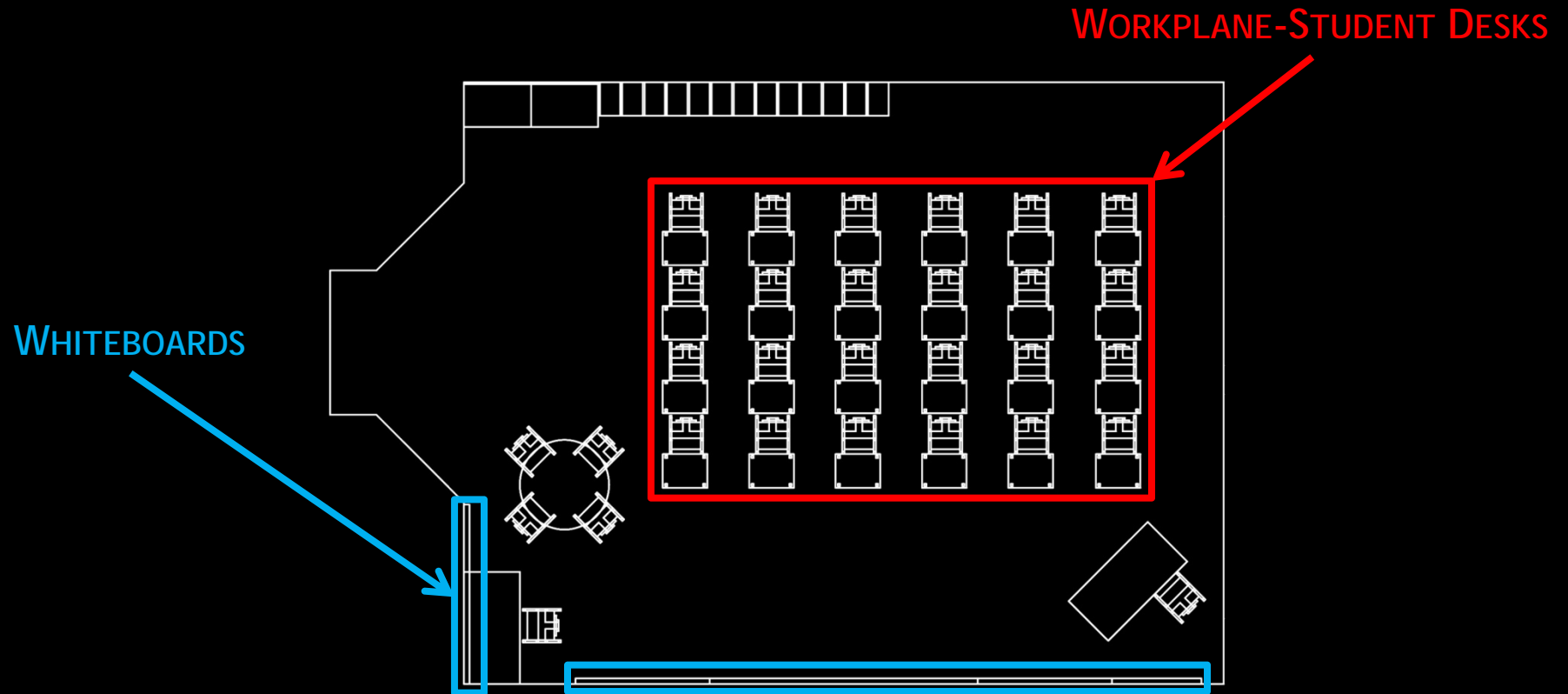
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PRIMARY CLASSROOM - PSYCHOLOGICAL IMPRESSION

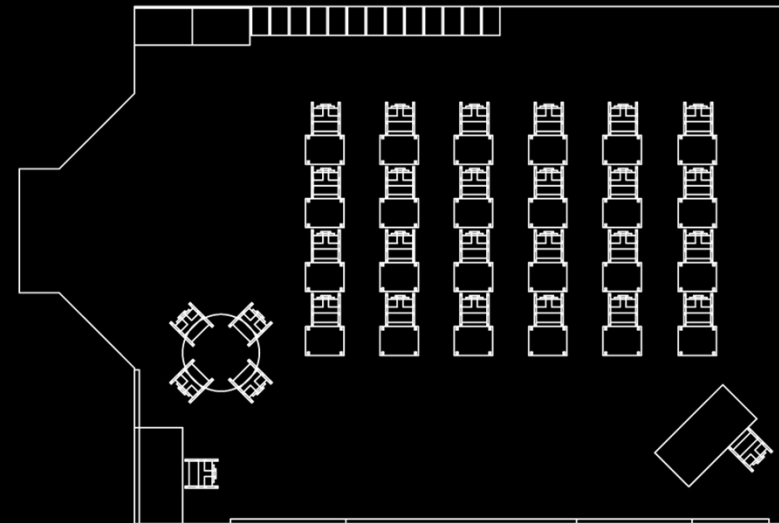
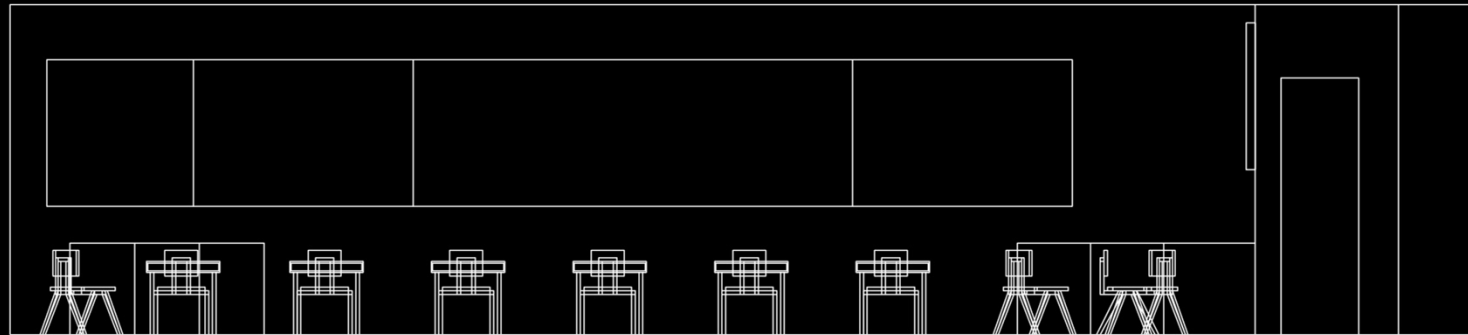
- PUBLIC IMPRESSION
 - HIGHER LEVELS OF ILLUMINATION SHOULD BE ACHIEVED
 - THE ROOM SHOULD BE PERCEIVED AS BRIGHT
 - UNIFORMITY ON SURFACES SHOULD BE ACHIEVED
 - UNIFORM LIGHTING LAYOUT

CRYSTAL LAKE ELEMENTARY SCHOOL

MAIN DESIGN FEATURES



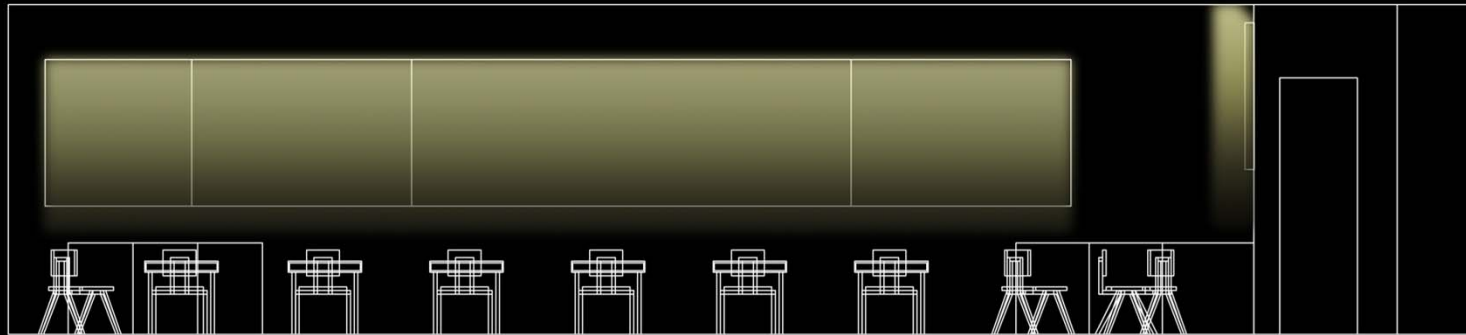
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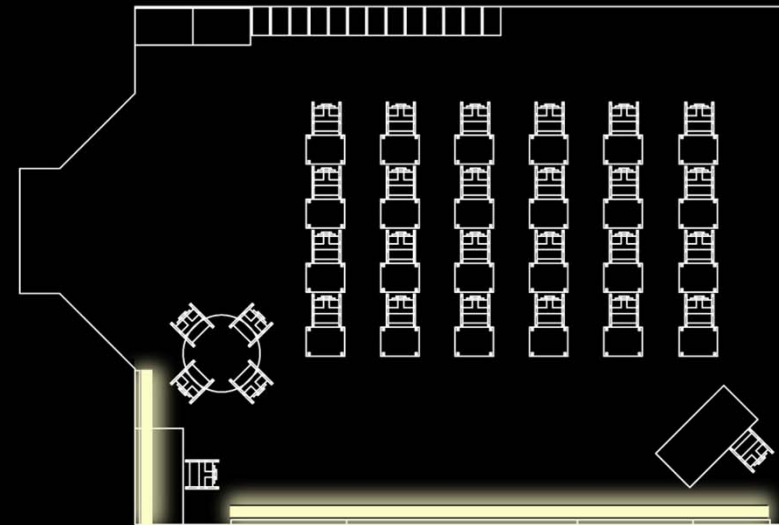
WINDOWS

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WASH THE WHITEBOARDS TO
ACHIEVE UNIFORMITY

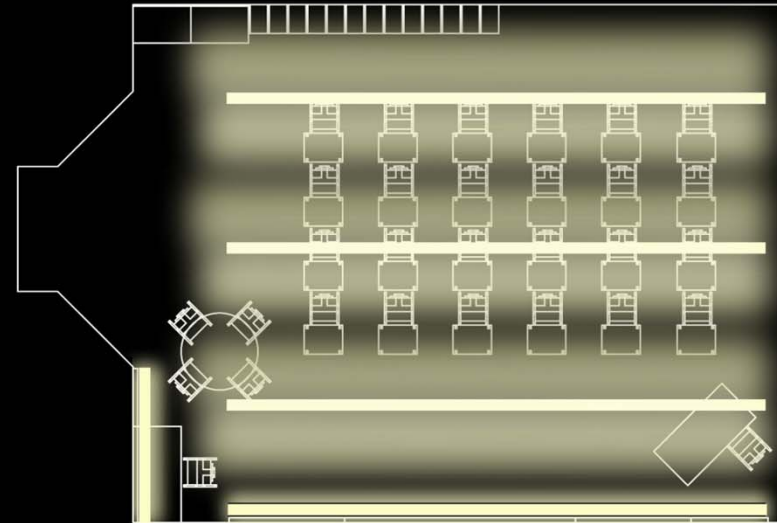


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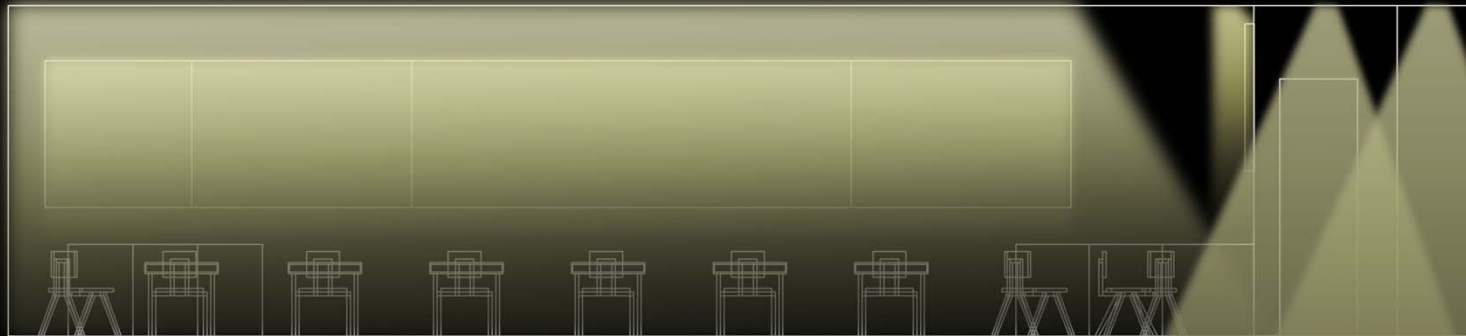
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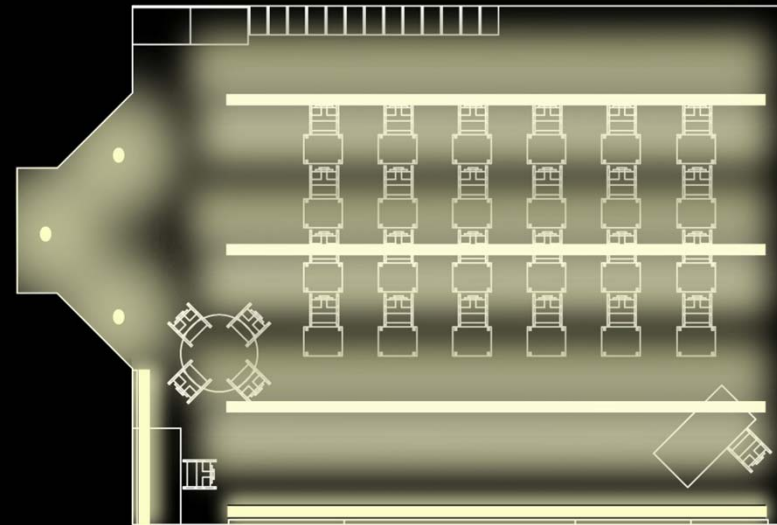
CREATE UNIFORMITY ON THE
WORKPLANE WITH A UNIFORM
LIGHTING LAYOUT



CRYSTAL LAKE ELEMENTARY SCHOOL



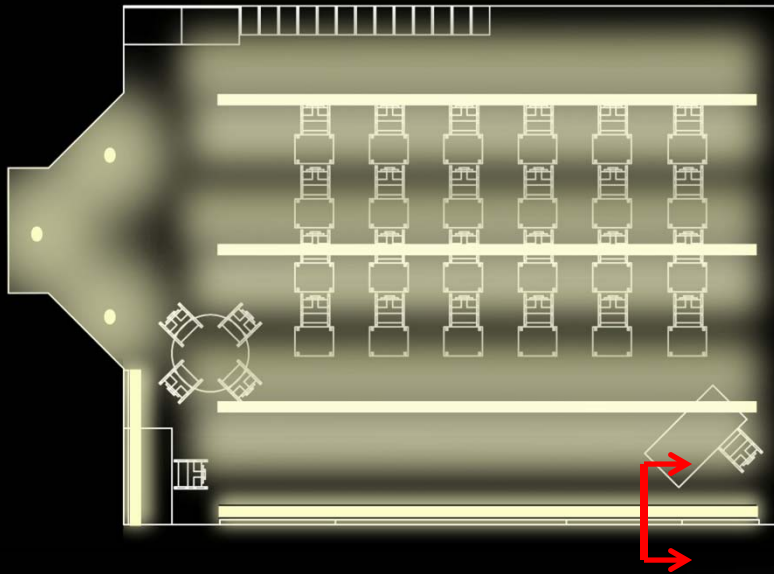
CREATE UNIFORMITY THROUGHOUT
THE SPACE WHILE HIGHLIGHTING
ROOM EXITS



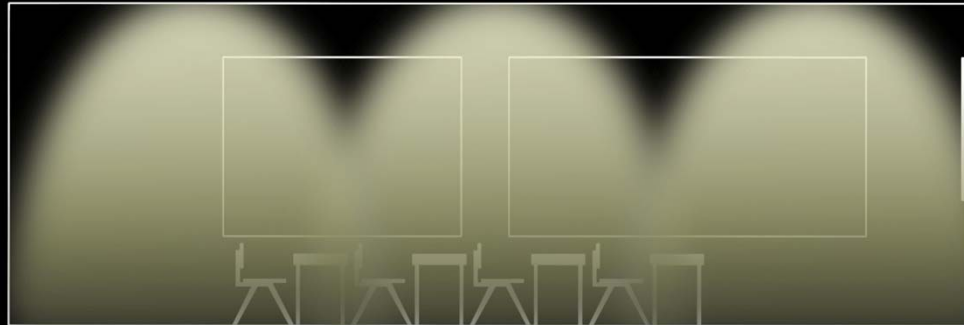
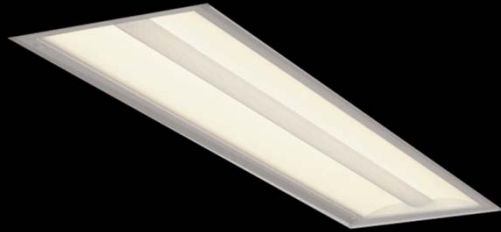
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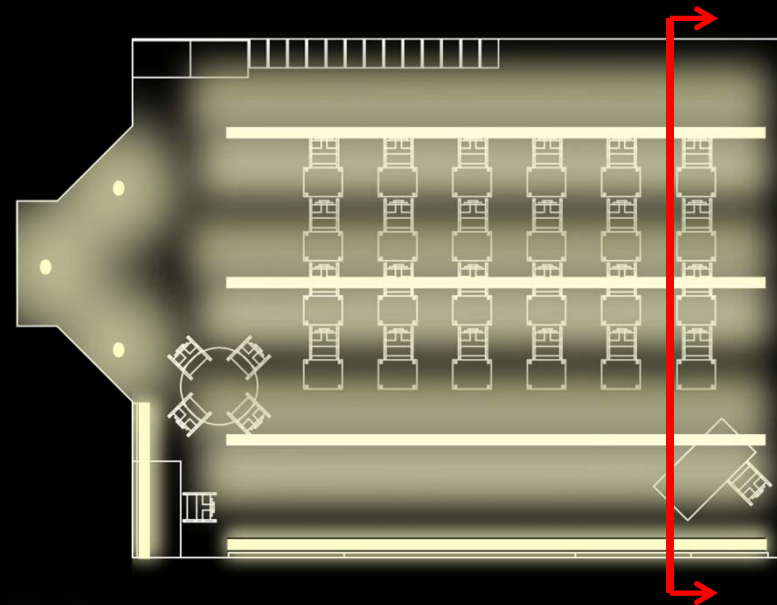
WALL MOUNTED LUMINAIRE TO UNIFORMLY
LIGHT THE WHITEBOARDS



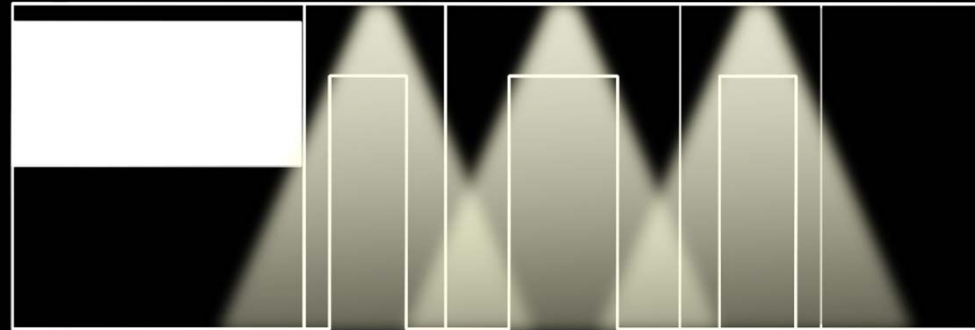
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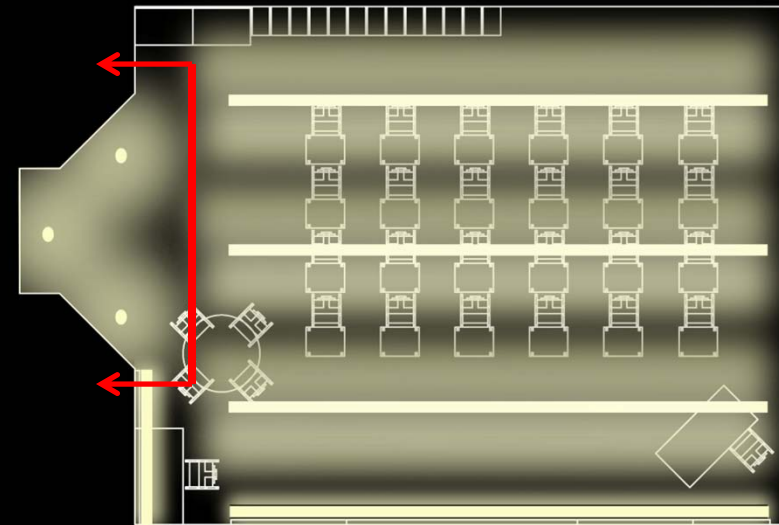
CEILING RECESSED LINEAR FLUORESCENT LUMINAIRE TO APPLY UNIFORM LIGHTING TO THE WORKPLANE



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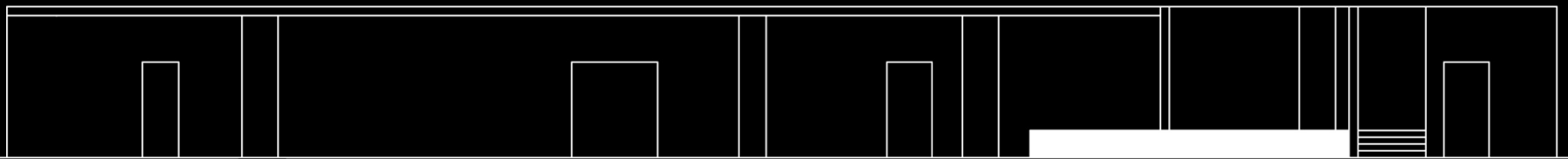


CEILING RECESSED DOWNLIGHTS TO HELP
CREATE UNIFORMITY THROUGHOUT SPACE



CRYSTAL LAKE ELEMENTARY SCHOOL

MULTIPURPOSE ROOM



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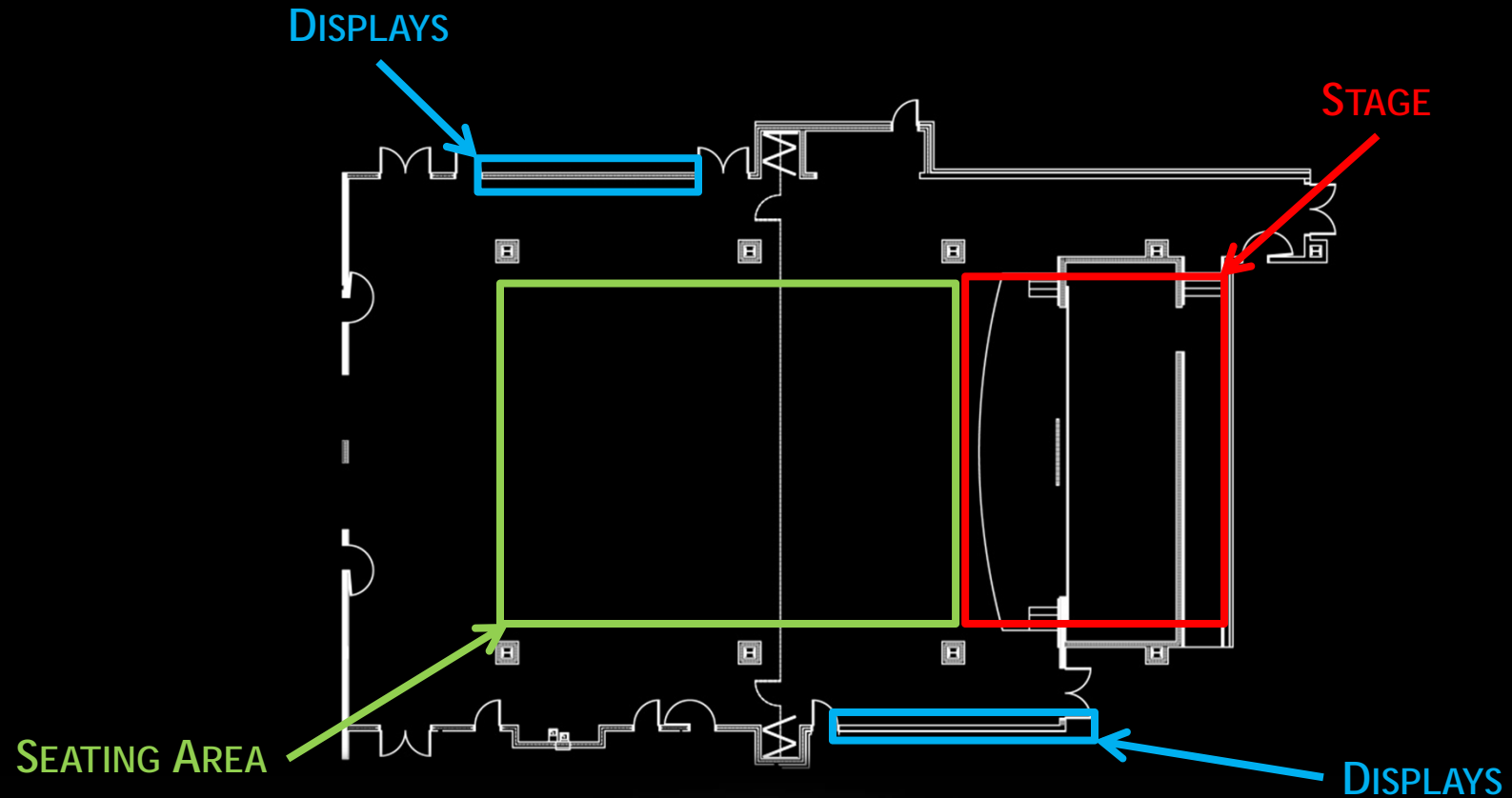
CRYSTAL LAKE ELEMENTARY SCHOOL

MULTIPURPOSE ROOM - DESIGN CRITERIA

- UNIFORMITY ON THE WORKPLANE SHOULD BE ACHIEVED
- LIGHT PERIMETER FOR DISPLAYS
- LIGHTING SHOULD DIRECT FOCUS TO STAGE WHEN USED AS AN AUDITORIUM
- GOOD MODELING OF FACES ON THE STAGE WHEN NEEDED
- AVOID VISUAL CLUTTER
- AVOID GLARE

CRYSTAL LAKE ELEMENTARY SCHOOL

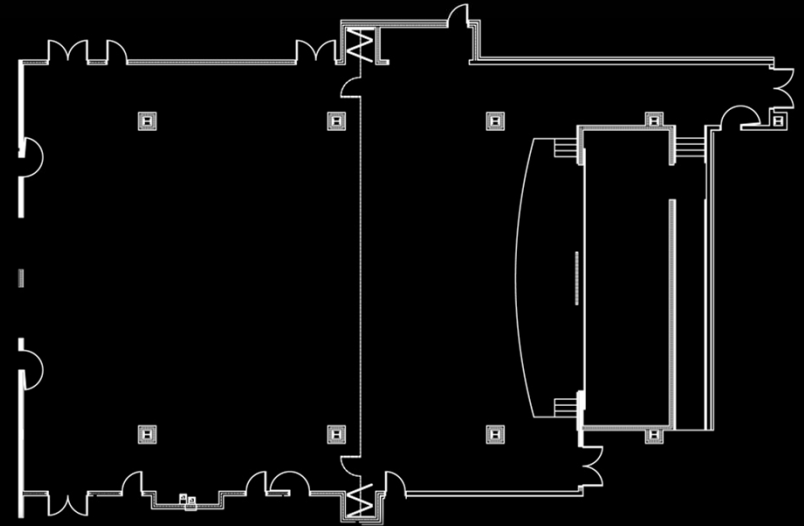
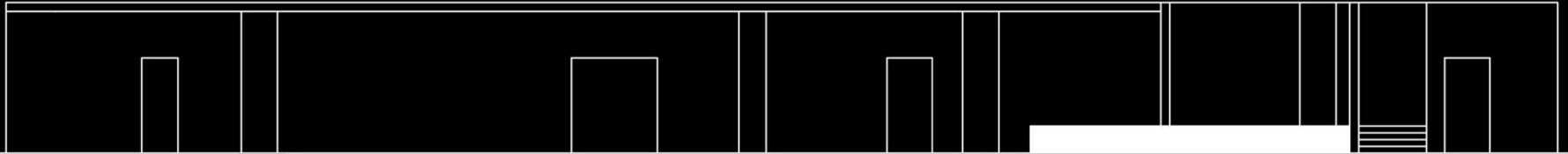
MAIN DESIGN FEATURES



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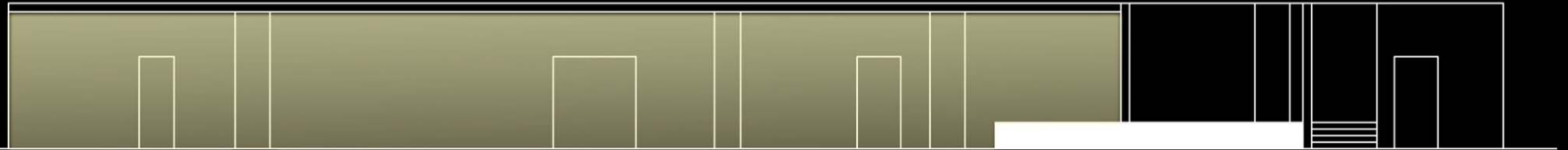
SCENARIO 1 - UNIFORMITY



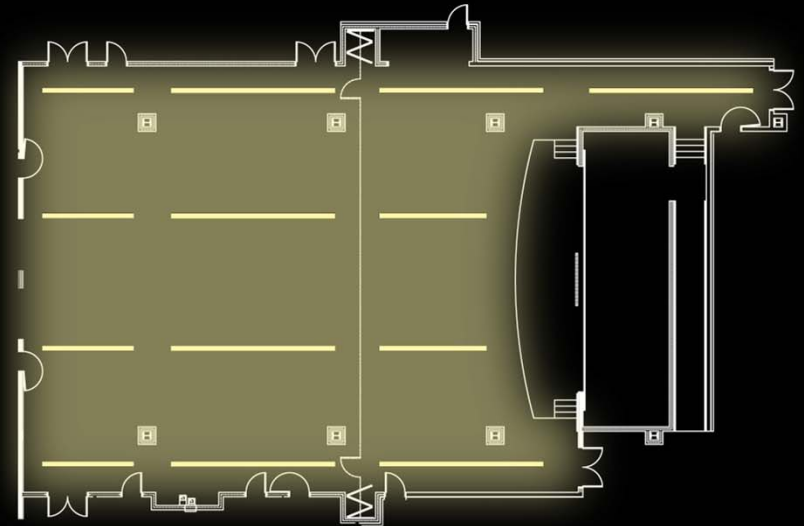
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CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 1 - UNIFORMITY



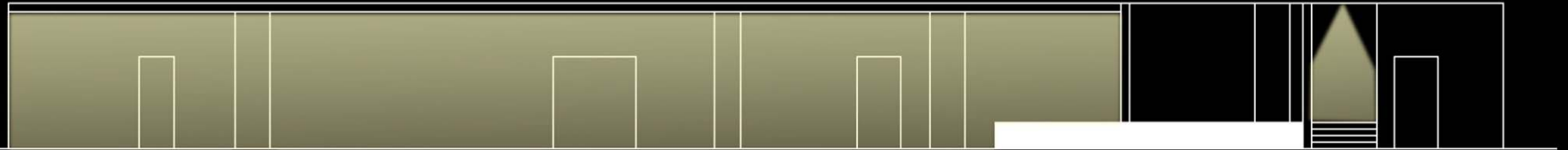
UNIFORM LIGHTING LAYOUT CREATES UNIFORMITY
THROUGHOUT SPACE



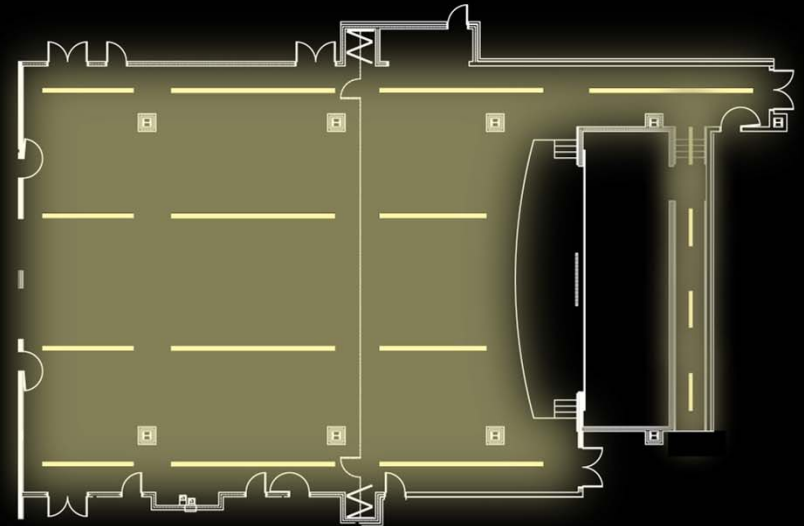
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SCENARIO 1 - UNIFORMITY



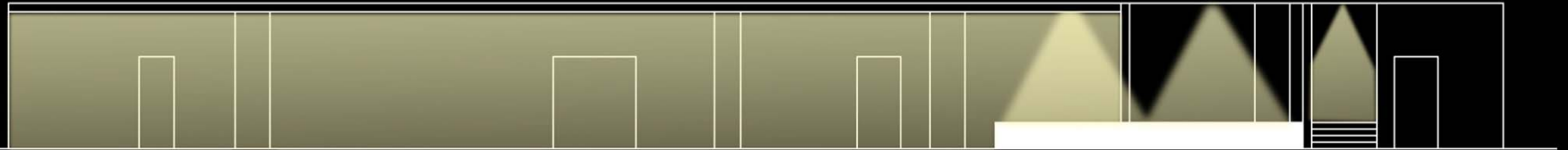
UNIFORM LIGHTING LAYOUT THAT
CREATES UNIFORMITY IN WALKWAYS
BEHIND STAGE



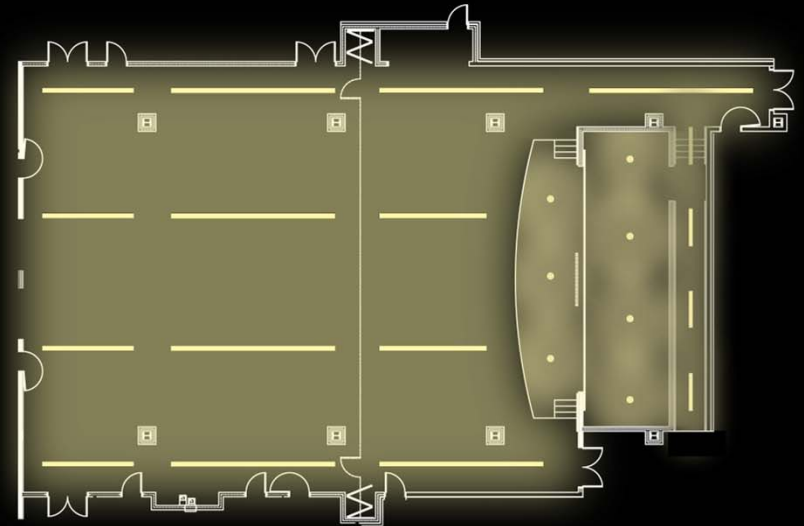
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SCENARIO 1 - UNIFORMITY



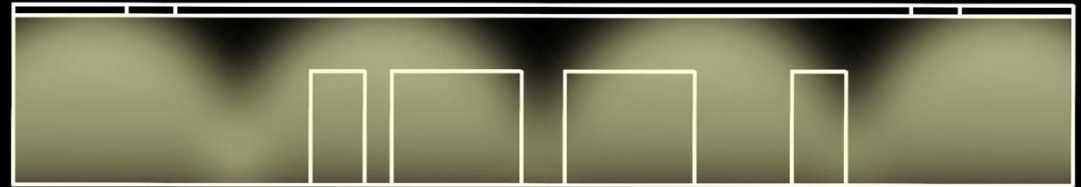
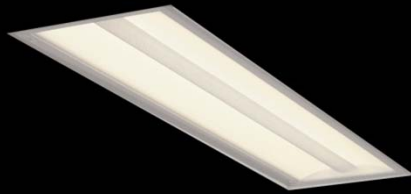
UNIFORM LIGHTING LAYOUT
CREATES UNIFORMITY ON STAGE



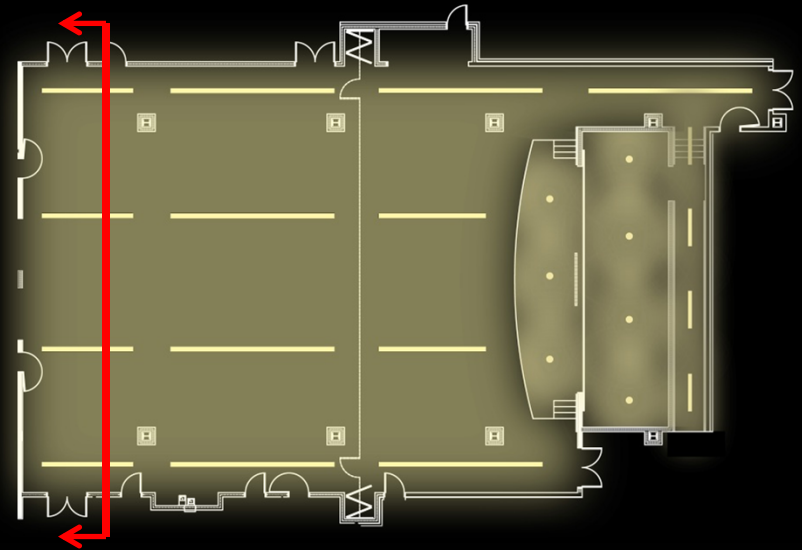
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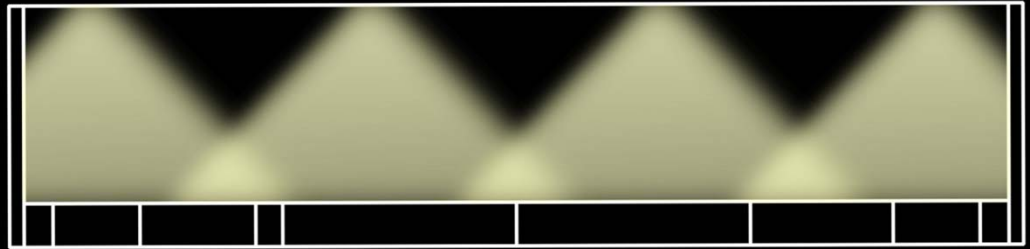


LINEAR RECESSED LUMINAIRES TO PROVIDE
UNIFORM LIGHTING THROUGHOUT SPACE

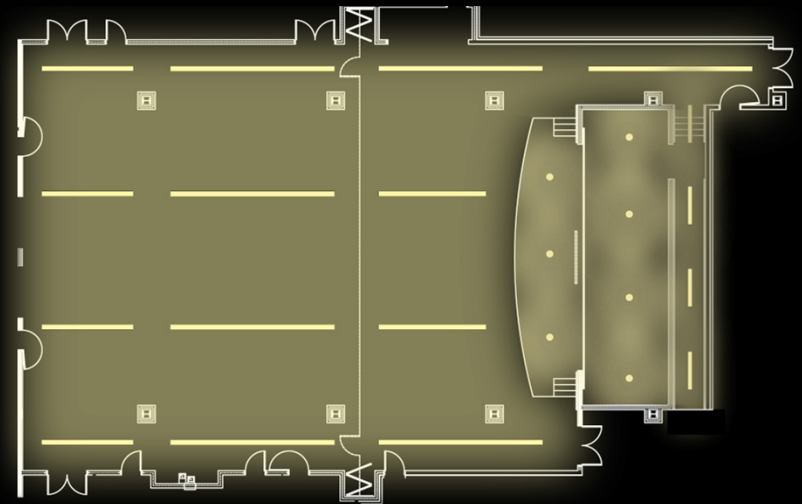


CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 1 - UNIFORMITY



RECESSED DOWNLIGHTS TO
PROVIDE UNIFORMITY ON STAGE

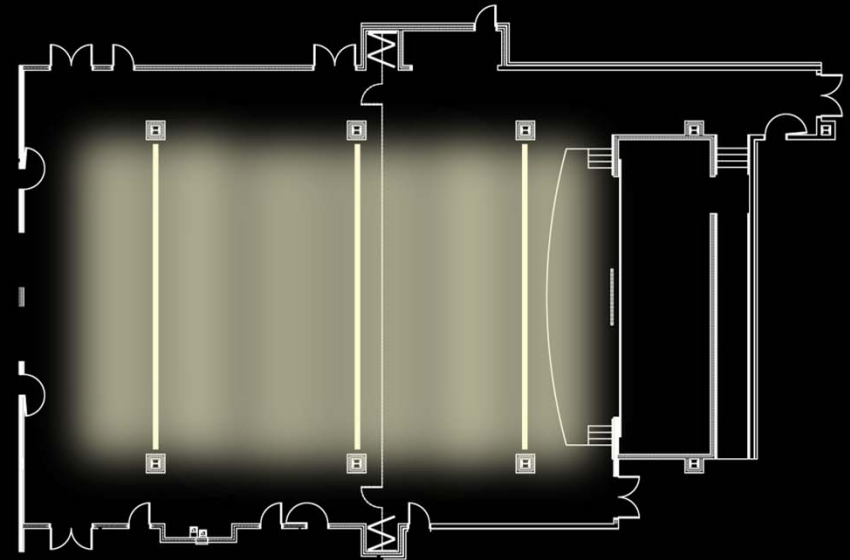


CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 2 - FUNCTIONAL



ADEQUATE LIGHTING FOR POPULATED SPACE
WITHIN ROOM

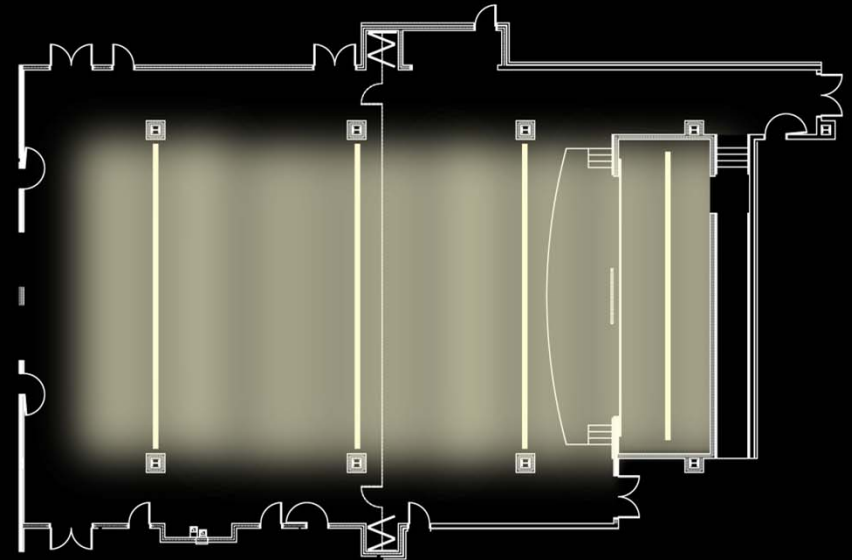


CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 2 - FUNCTIONAL



ADEQUATE LIGHTING ON STAGE



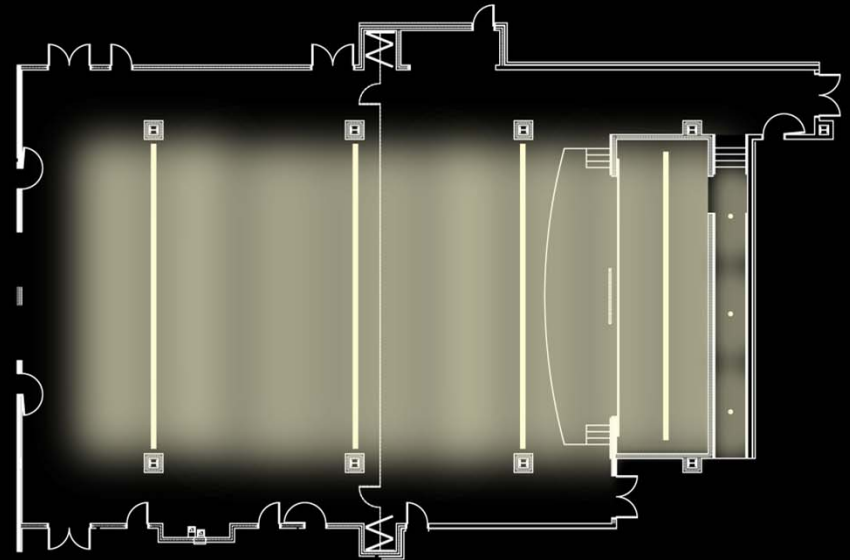
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CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 2 - FUNCTIONAL



ADEQUATE LIGHTING FOR CIRCULATION IN
THE WALKWAY BEHIND THE STAGE

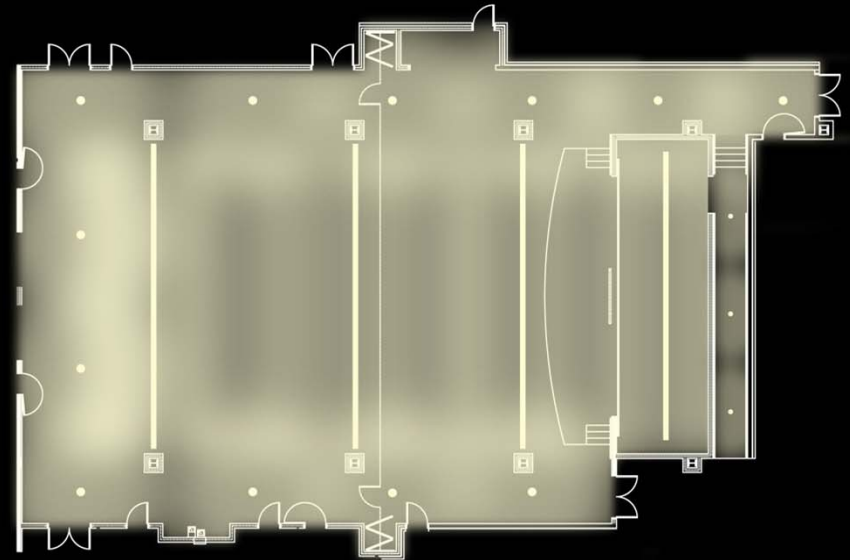


CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 2 - FUNCTIONAL



ADEQUATE LIGHTING FOR CIRCULATION
SPACES WITHIN ROOM



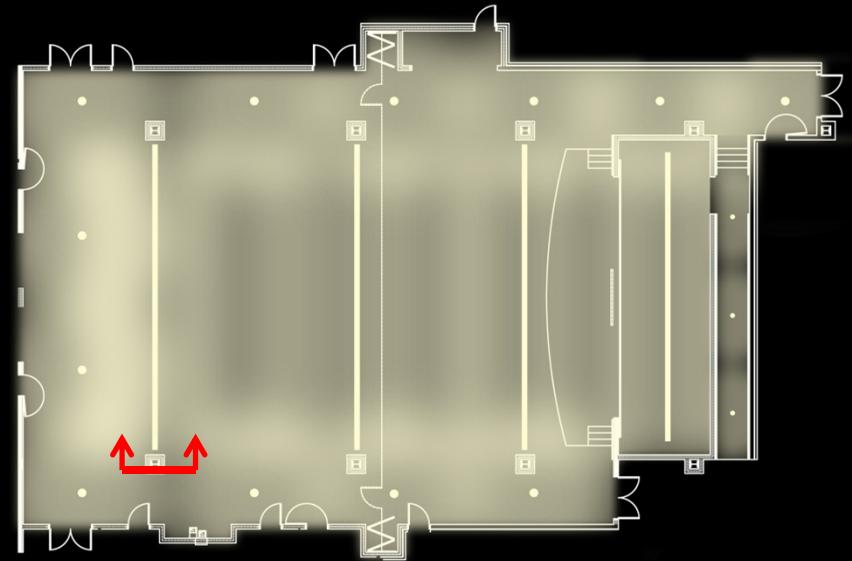
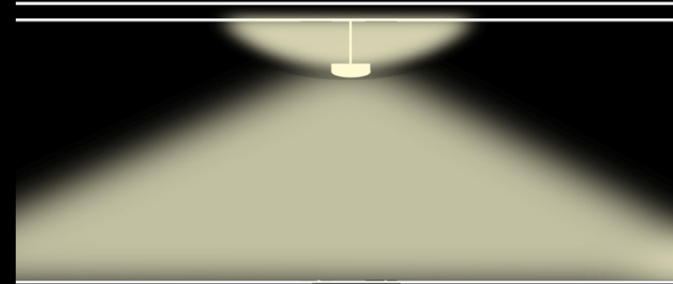
INTRODUCTION | COVERED ENTRY | LOBBY | CLASSROOM | MULTIPURPOSE ROOM

CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 2 - FUNCTIONAL



DIRECT/INDIRECT LINEAR PENDANT MOUNTED
LUMINAIRE FOR UNIFORM LIGHTING IN
POPULATED SPACE

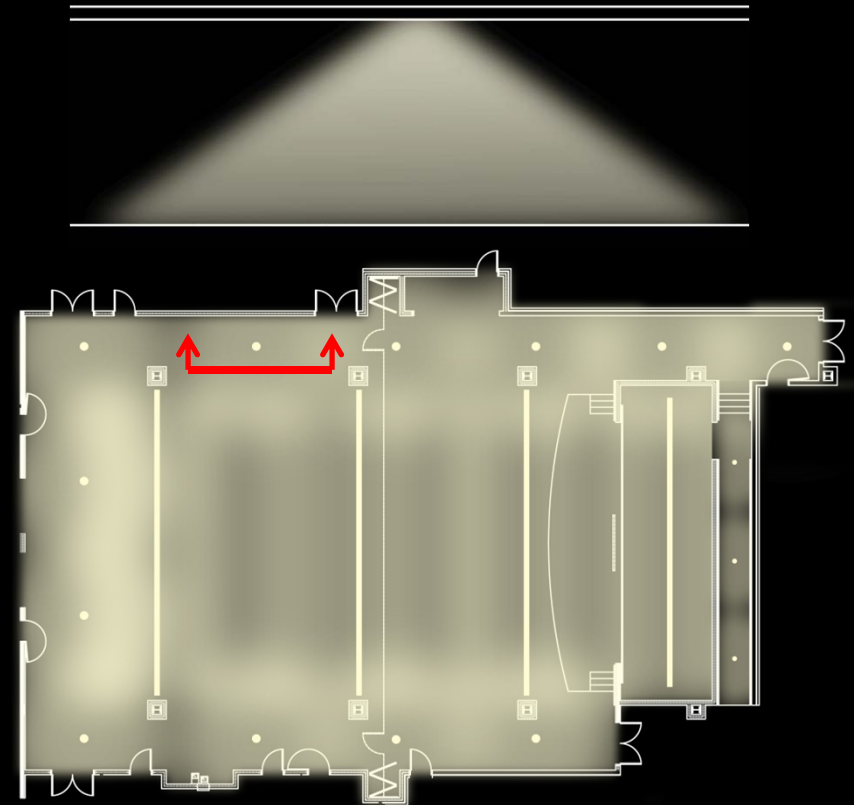


CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 2 - FUNCTIONAL

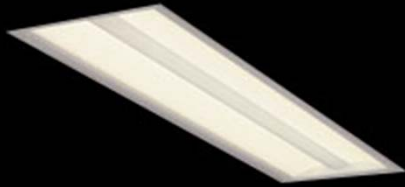


CEILING RECESSED DOWNLIGHTS TO PROVIDE
LIGHT TO CIRCULATION SPACES WITHIN THE ROOM

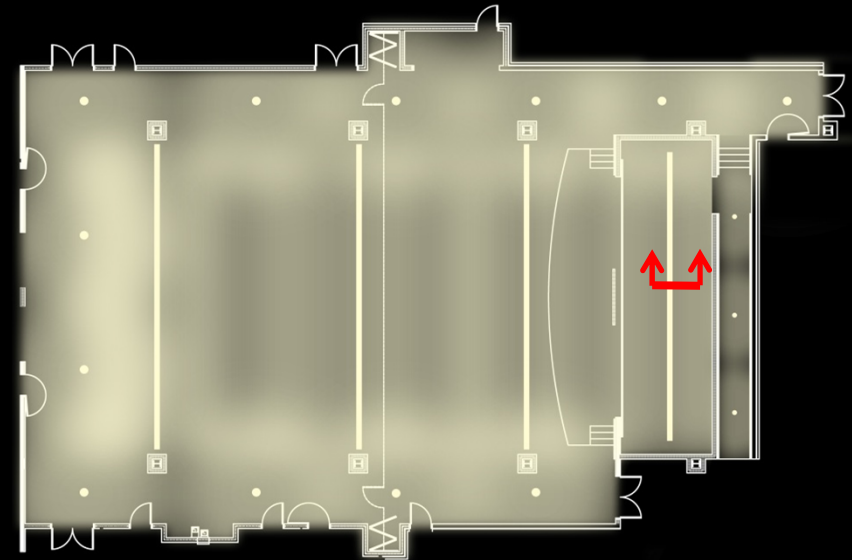
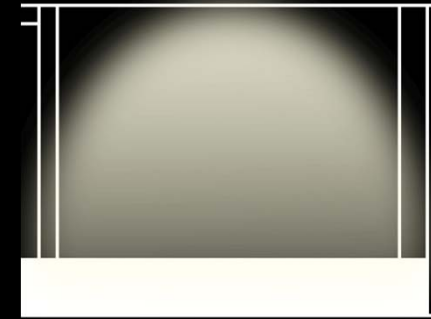


CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 2 - FUNCTIONAL

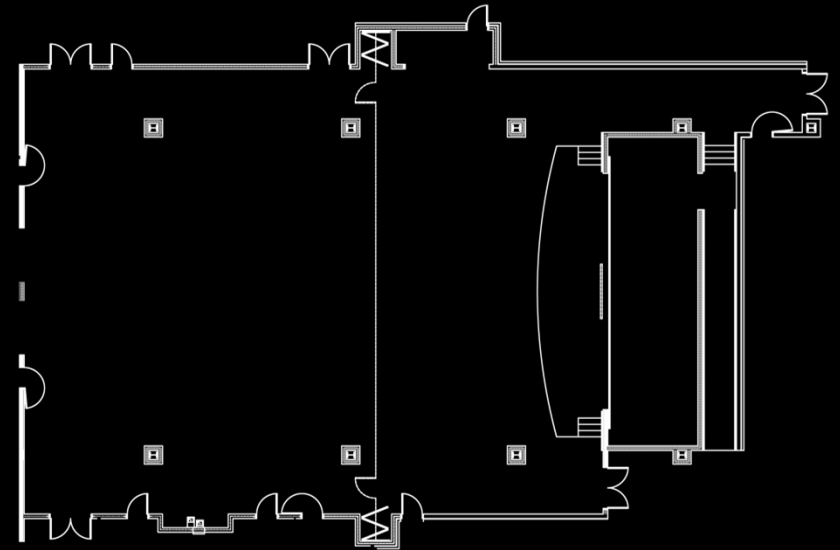


CEILING RECESSED LINEAR LUMINAIRE TO
PROVIDE LIGHT TO STAGE



CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 3 - EMPHASIS ON PERIMETER



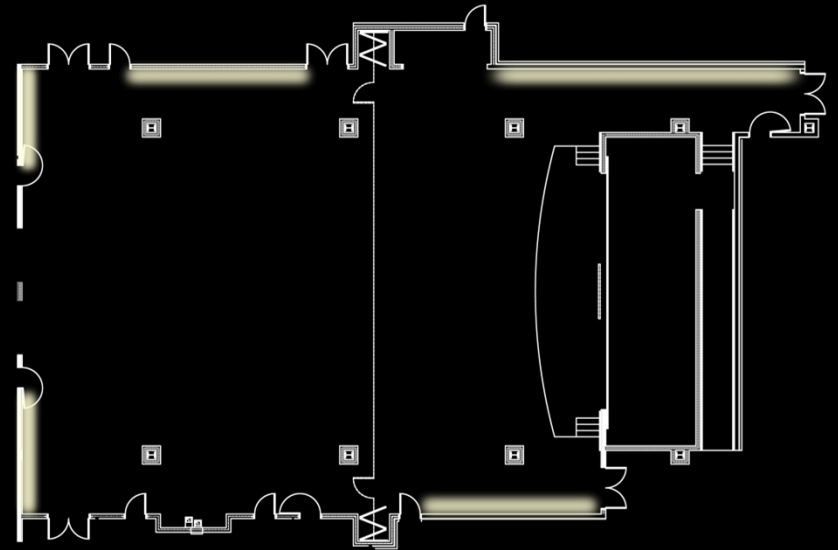
INTRODUCTION | COVERED ENTRY | LOBBY | CLASSROOM | MULTIPURPOSE ROOM

CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 3 - EMPHASIS ON PERIMETER



WALL WASHING TO HIGHLIGHT DISPLAYS ON PERIMETER OF ROOM

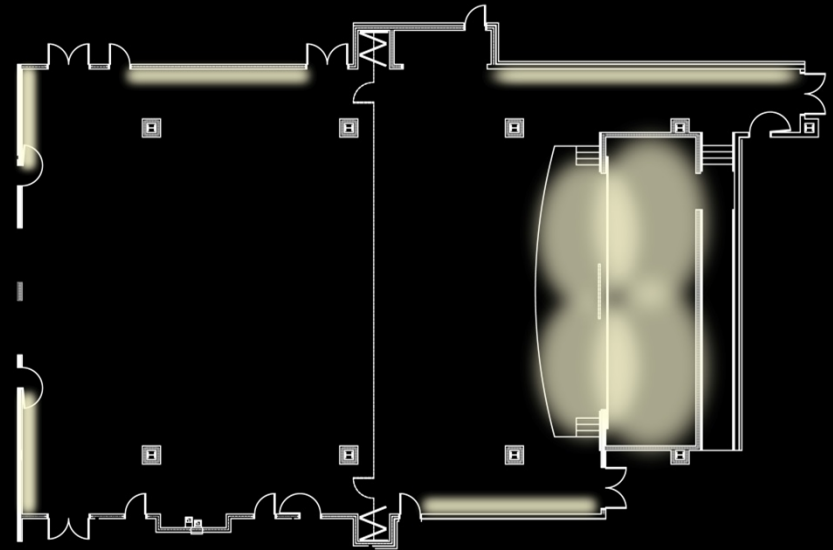


CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 3 - EMPHASIS ON PERIMETER



TRACK LIGHTING TO HIGHLIGHT STAGE



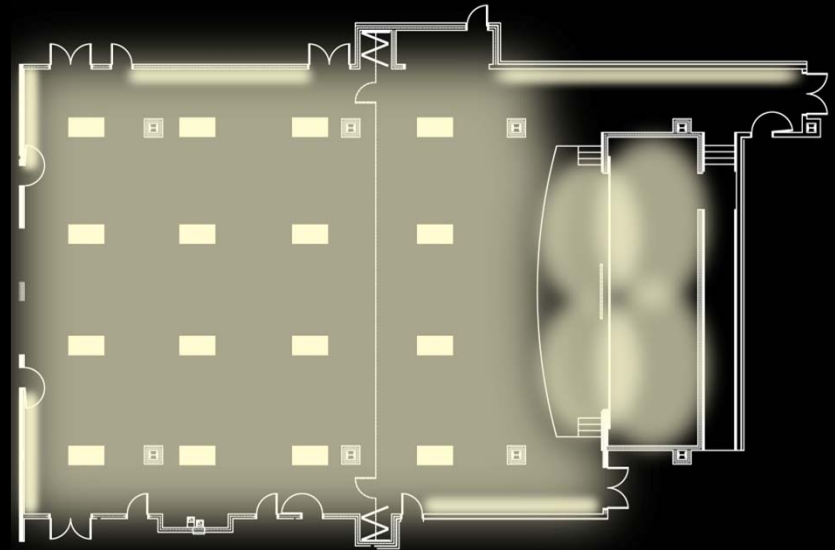
INTRODUCTION | COVERED ENTRY | LOBBY | CLASSROOM | MULTIPURPOSE ROOM

CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 3 - EMPHASIS ON PERIMETER



LINEAR RECESSED LIGHTING TO PROVIDE
AMBIENT LIGHT FOR SPACE



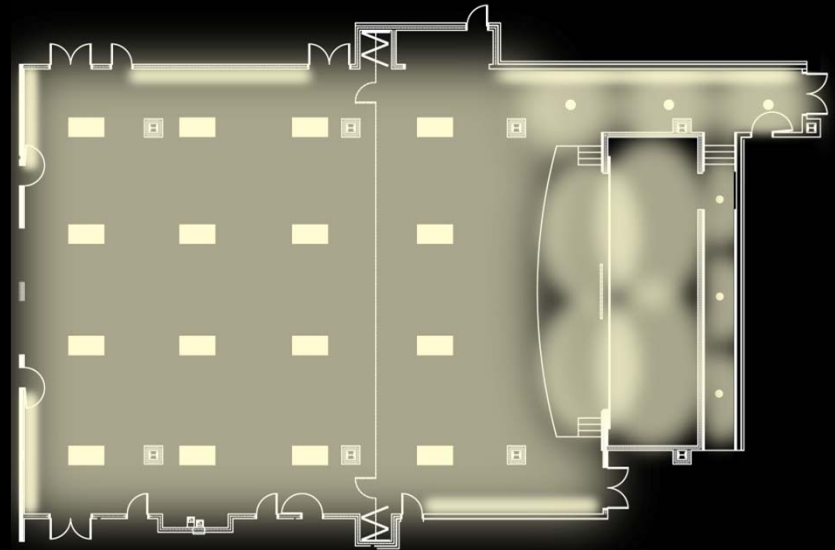
INTRODUCTION | COVERED ENTRY | LOBBY | CLASSROOM | MULTIPURPOSE ROOM

CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 3 - EMPHASIS ON PERIMETER



RECESSED LIGHTING TO PROVIDE AMBIENT
LIGHT IN THE SPACE

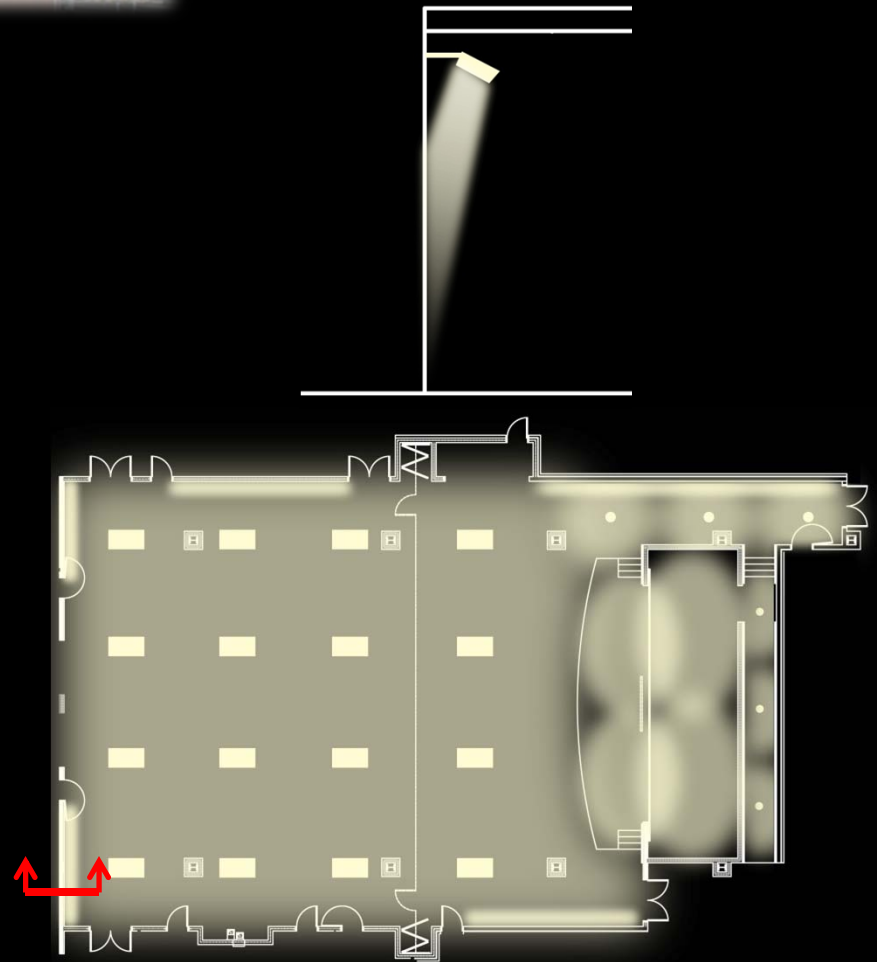


CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 3 - EMPHASIS ON PERIMETER



WALL MOUNTED WALL WASHER TO PROVIDE LIGHT TO THE PERIMETER AND HIGHLIGHTING DISPLAYS

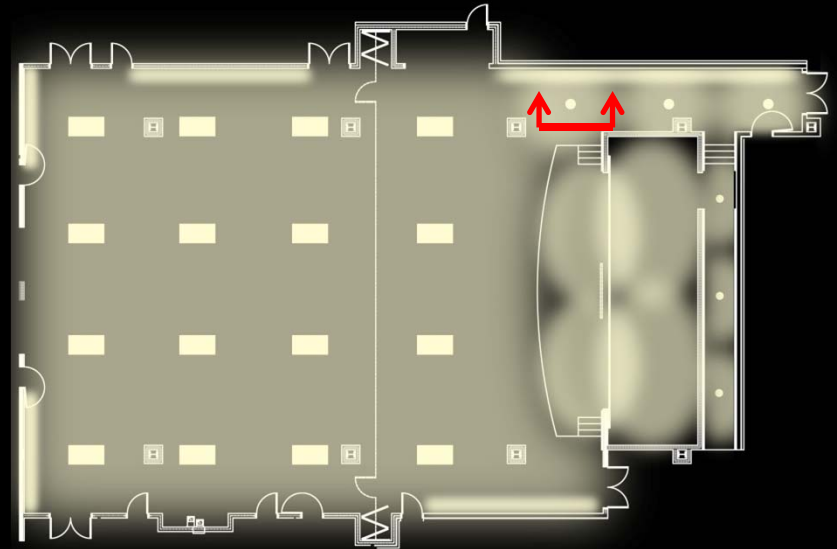
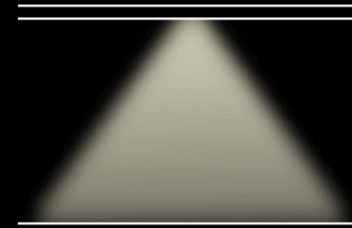


CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 3 - EMPHASIS ON PERIMETER



CEILING RECESSED DOWNLIGHTS TO PROVIDE
LIGHT TO CIRCULATION SPACE

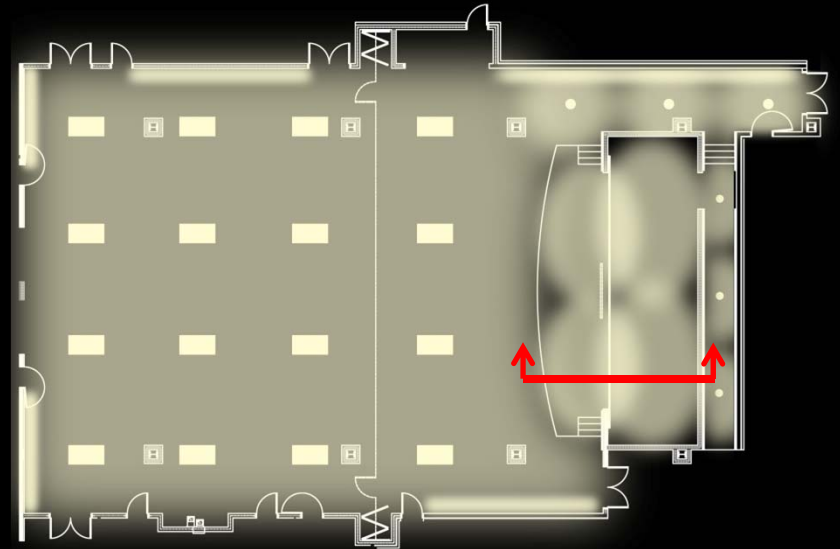
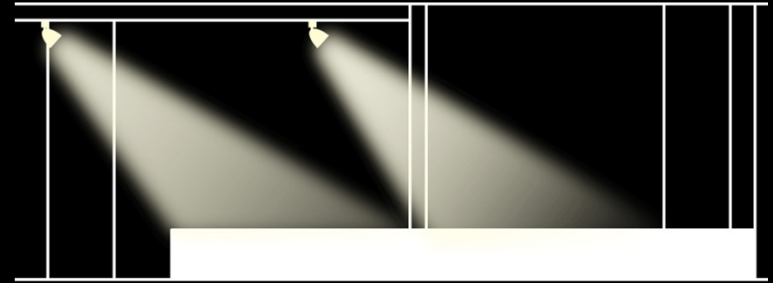


CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 3 - EMPHASIS ON PERIMETER



SURFACE MOUNTED TRACK LIGHTING TO PROVIDE LIGHT ON THE STAGE WHEN NEEDED

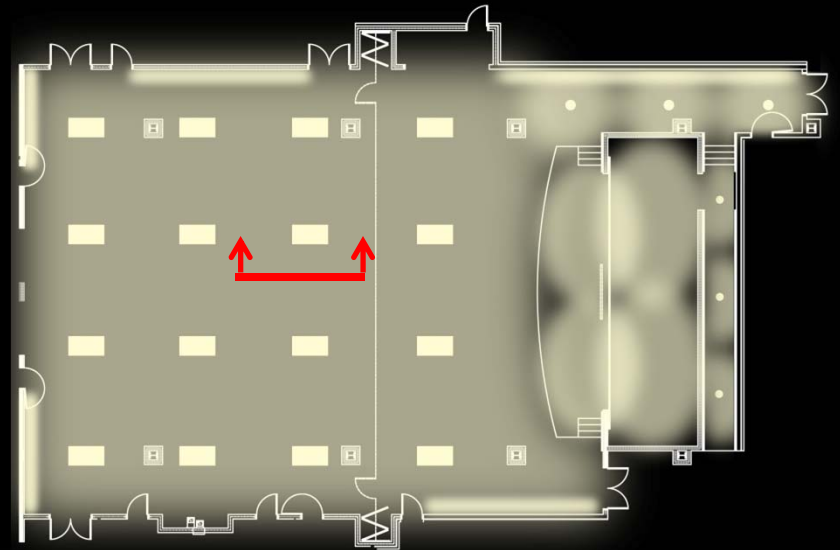


CRYSTAL LAKE ELEMENTARY SCHOOL

SCENARIO 3 - EMPHASIS ON PERIMETER



RECESSED LUMINAIRES THAT PROVIDE AMBIENT
LIGHT IN THE SPACE



CRYSTAL LAKE ELEMENTARY SCHOOL

CONCLUSION

- CREATE A WELCOMING ENVIRONMENT
- LIGHT DESIGN SHOULD ENHANCE STUDENTS ABILITY TO LEARN
- CREATE AN ENERGY EFFICIENT DESIGN



THANK YOU!
ANY QUESTIONS?



LEAH MATERN | AE SENIOR THESIS | LIGHTING/ELECTRICAL | DECEMBER 8, 2010