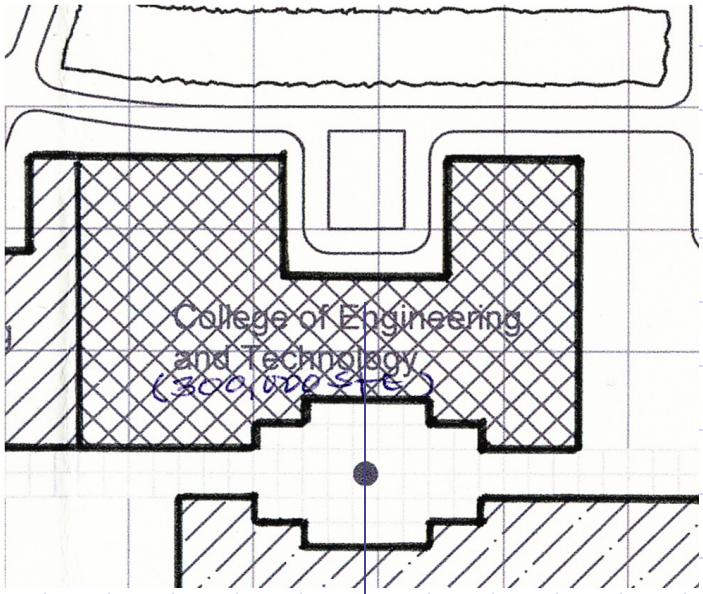
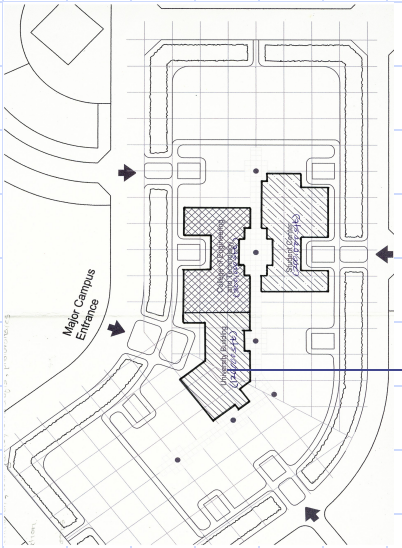
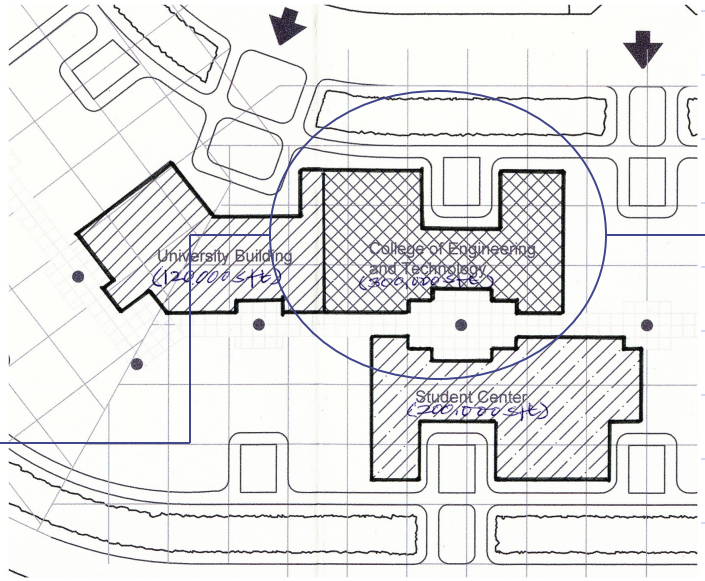
IPRO 323

SITING OF BUILDING FOOTPRINT:

DESCRIPTION: UNIVERSITY BUILDING







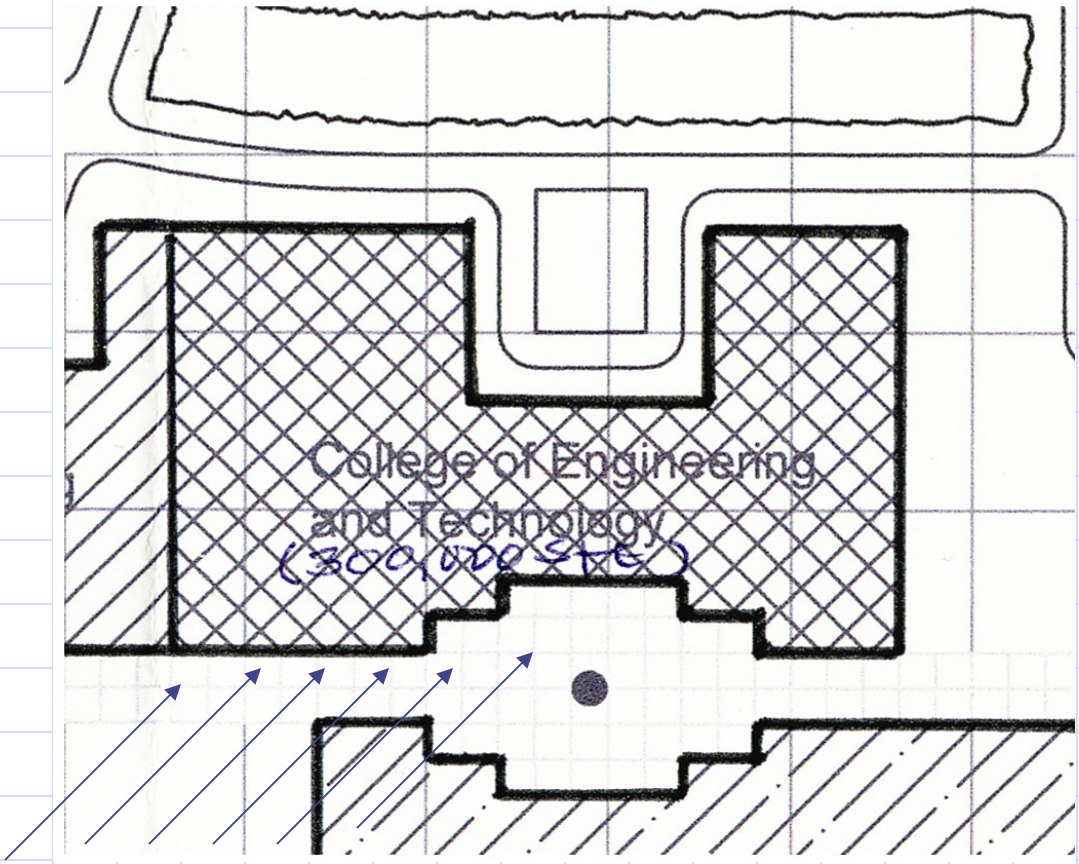
GROUP 2 12.05.03

IPRO 323

PANEL ORIENTATION

IDEAL ORIENTATION OF SHADING PANELS WOULD RELY ON THE SUN ANGLES INHERENT TO THE SITE.

ORIENTATION OF PV PANELS ON ROOF IS PARALLEL TO THE GROUND, BUT ELEVATED, ABOUT 5 FEET



THE DATA RETRIEVED FROM THE SOLAR EXPOSURE OF THE SITE WOULD ALSO REVEAL THE SHADING NEEDS FOR THE BUILDING USERS

GROUP 2 12.05.03

IPRO 323

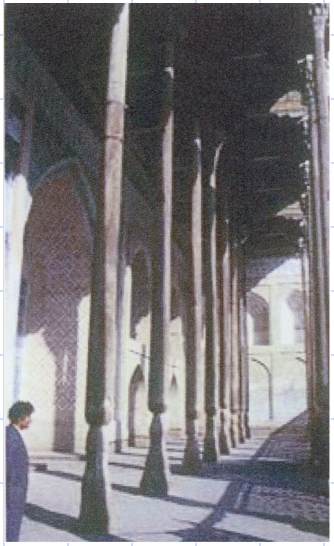
DESIGN SOLUTION OPTIONS:

UNIVERSITY BUILDING

INTEGRATION OF PHOTOVOLTAIC SCREENS TO BUILDING FAÇADE AS SHADING

PROPOSAL 1

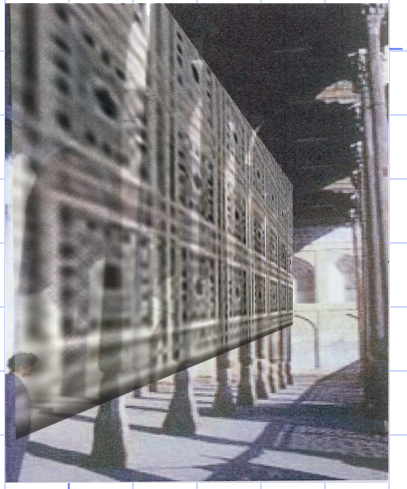
AND IN BUILDING COURTYARDS WHERE SOLAR SHADING IS REQUIRED;



GROUP 2 12.05.03

IPRO 323

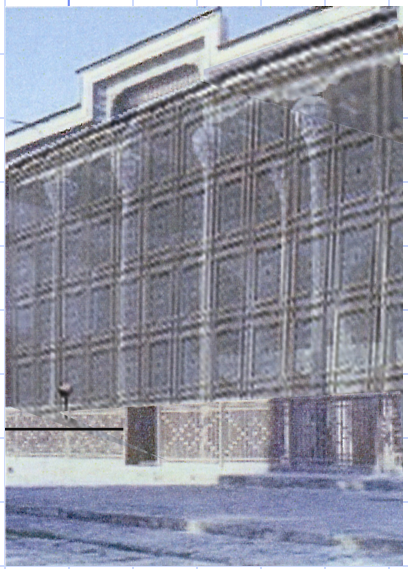
PROPOSAL 1:



APPLICATION OF SHADING ELEMENTS IN THE COURTYARD AND CORRIDOR SEPARATION:

-AESTHETIC SOLUTIONS USING ARABIC PATTERNS

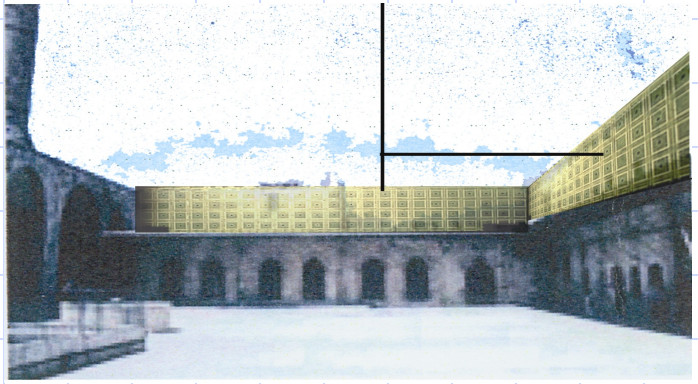
-LAYOUT OF PANELS AS A CURTAIN WALL OR AS A SCREEN ELEMENT



-SOLUTION REQUIRES A STRUCTURAL SUPPORT SYSTEM SIMILAR TO PREFABRICATED CURTAIN WALL SYSTEMS

-ORIENTATION TO THE SUN ANGLES WITHIN THE COURTYARD AND THE BUILDING FAÇADE

-ALL BIPV PANELS WITH SOLAR ABSORPTION CAPACITY TO BE PLACED ON ROOF



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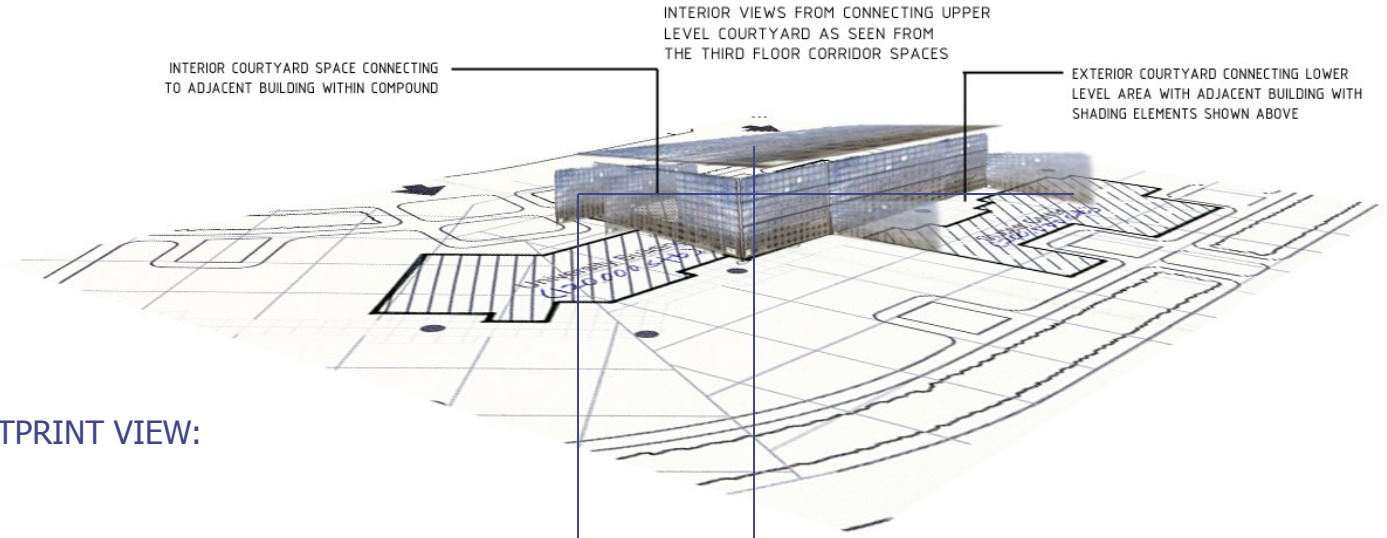
IPRO 323

PROPOSAL 1:

APPLICATION OF PV PANELS AS SHADING ELEMENTS



BUILDING FOOTPRINT VIEW:

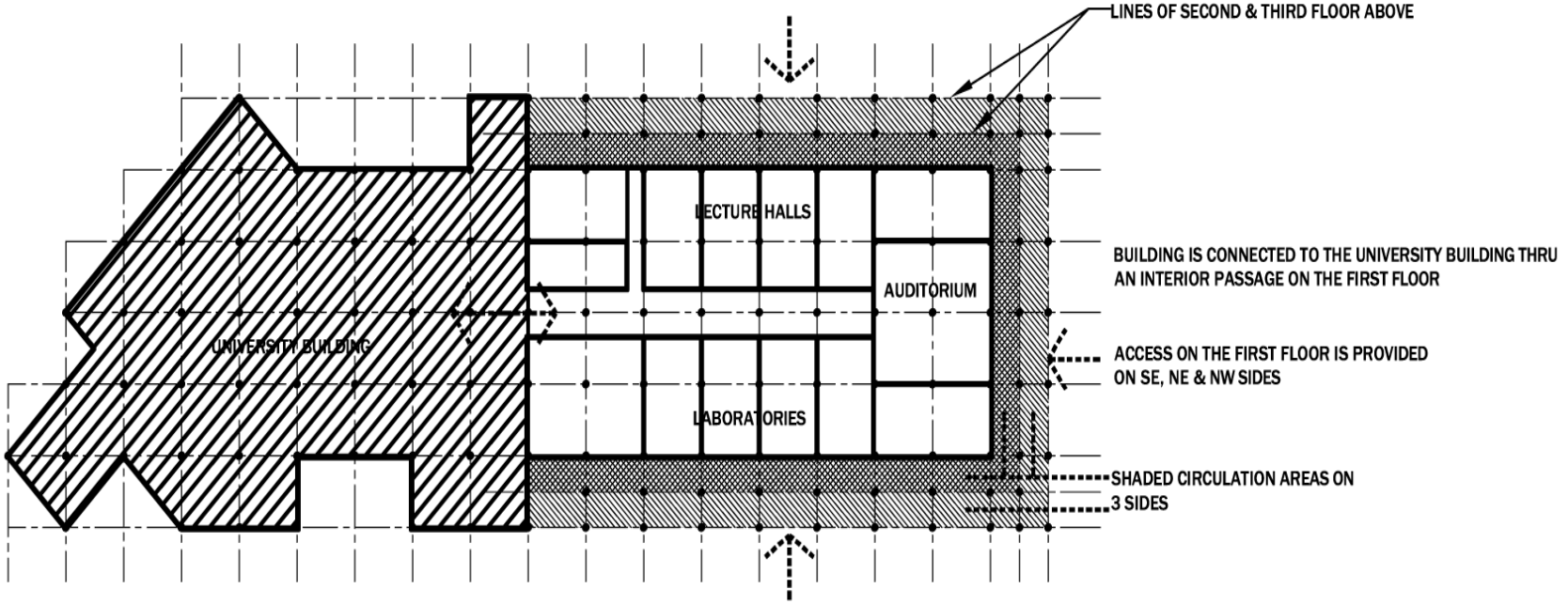
BIPV PANELS ON ROOF

SHADING ELEMENTS ON COURTYARD SPACES BOTH ON LOWER + UPPER LEVELS AND INTERIOR CORRIDORS

GROUP 2 12.05.03

IPRO 323

BUILDING FLOORPLANS

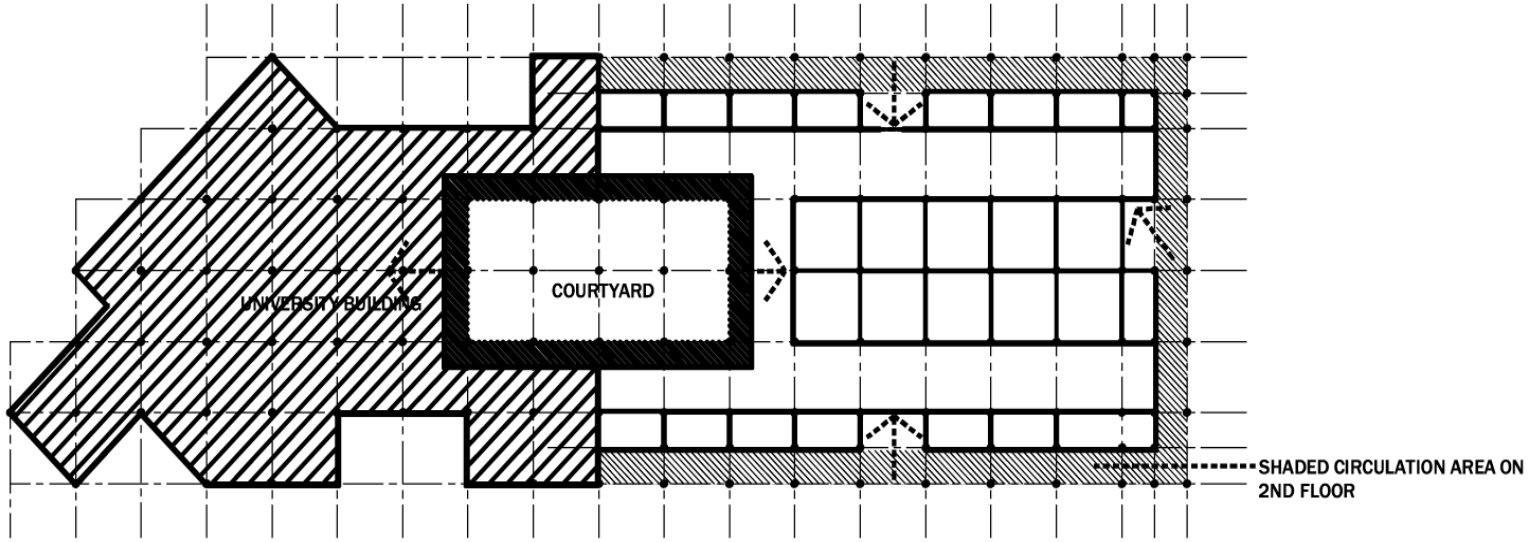


FIRST FLOOR PLAN

GROUP 2 12.05.03

IPRO 323

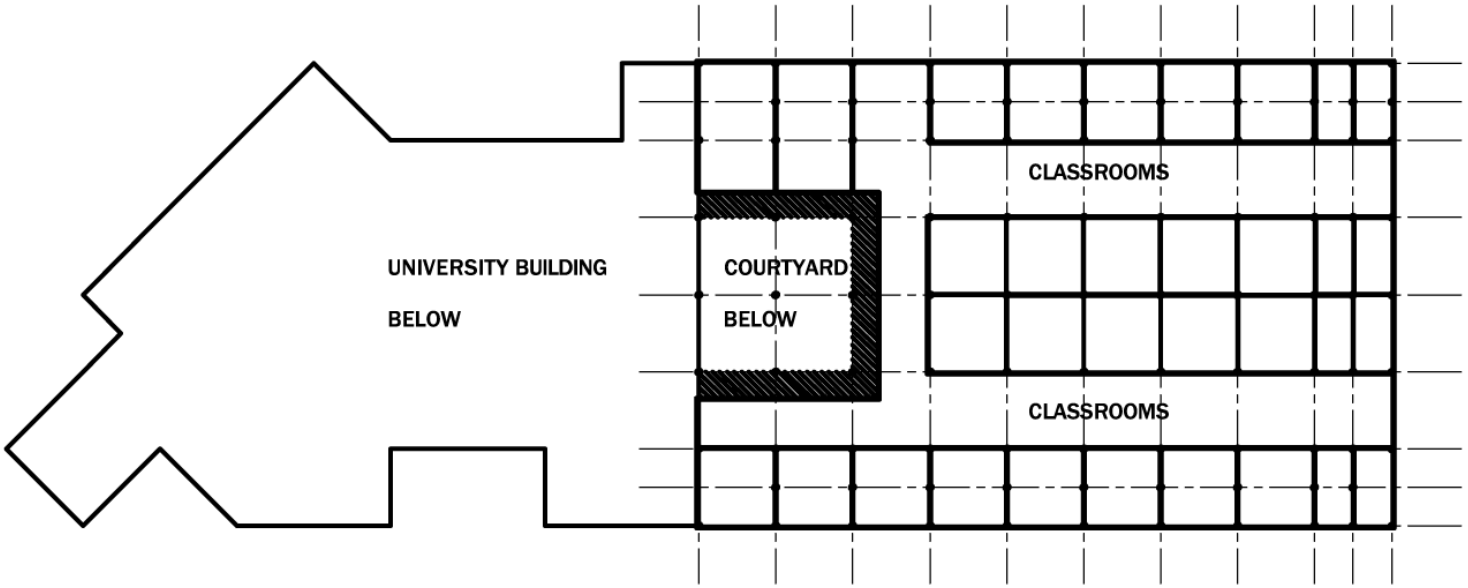
BUILDING FLOORPLANS



SECOND FLOOR PLAN

GROUP 2 12.05.03

BUILDING FLOORPLANS



THIRD FLOOR PLAN

IPRO 323

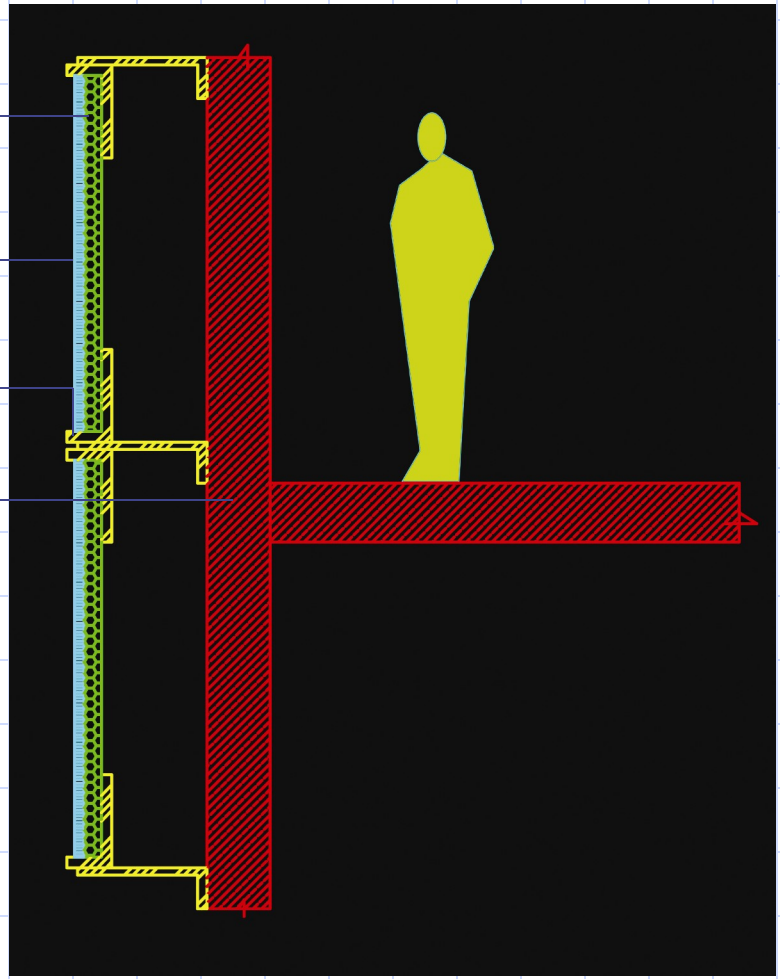
DIAGRAMMATIC DETAIL FOR BIPV INSTALLATION ON FACADE:

-BIPV UNITS WITH STEEL SUPPORT SYSTEM

-CURTAIN WALL SYSTEM CLADDING [SANDWICH PANEL-TYPE WITH GLASS SEPARATION

-2 FEET MECHANICAL SPACE TO RUN COOLING

-TROMBE WALL AS THERMAL BREAK FROM WARM EXTERIOR TO COOL INTERIOR



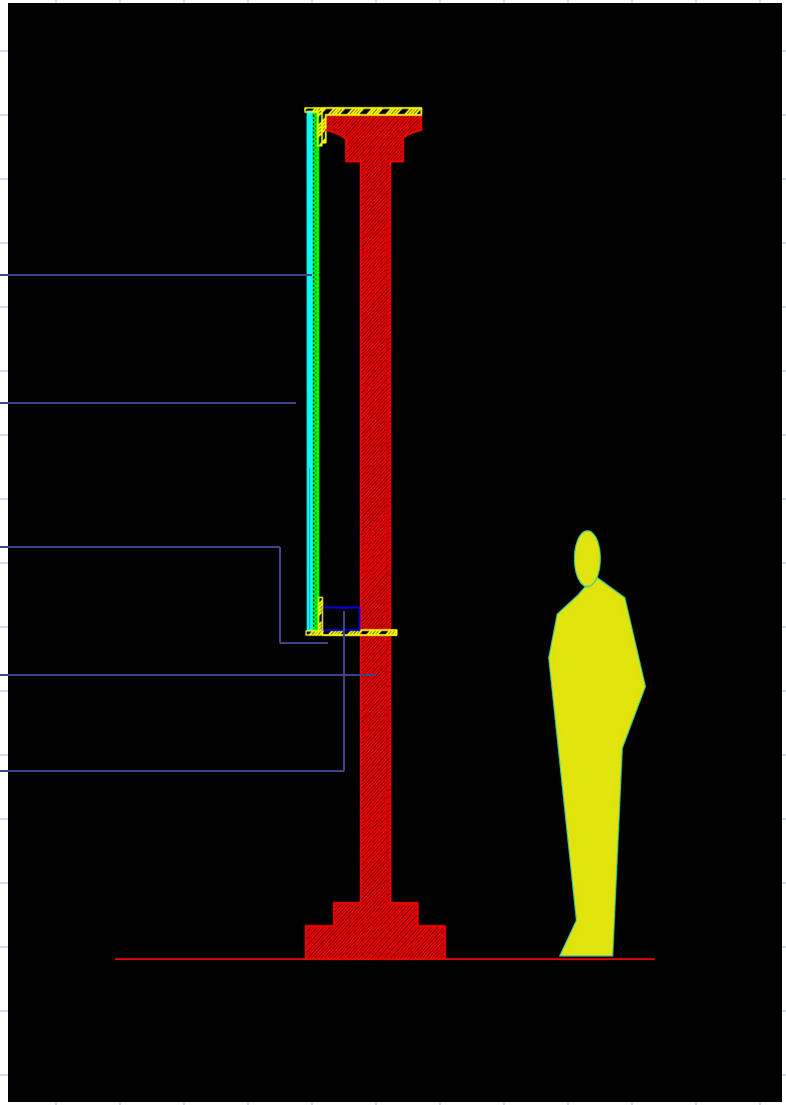
GROUP 2 12.05.03

IPRO 323

DIAGRAMMATIC DETAIL FOR BIPV INSTALLATION ON COURTYARD COLUMNS:

-SHADING AREA CONVERTED FROM TRADITIONAL CORRIDORS

-SEPARATION BETWEEN COURTYARD AREA AND CLASSROOM ENTRANCES



GROUP 2 12.05.03

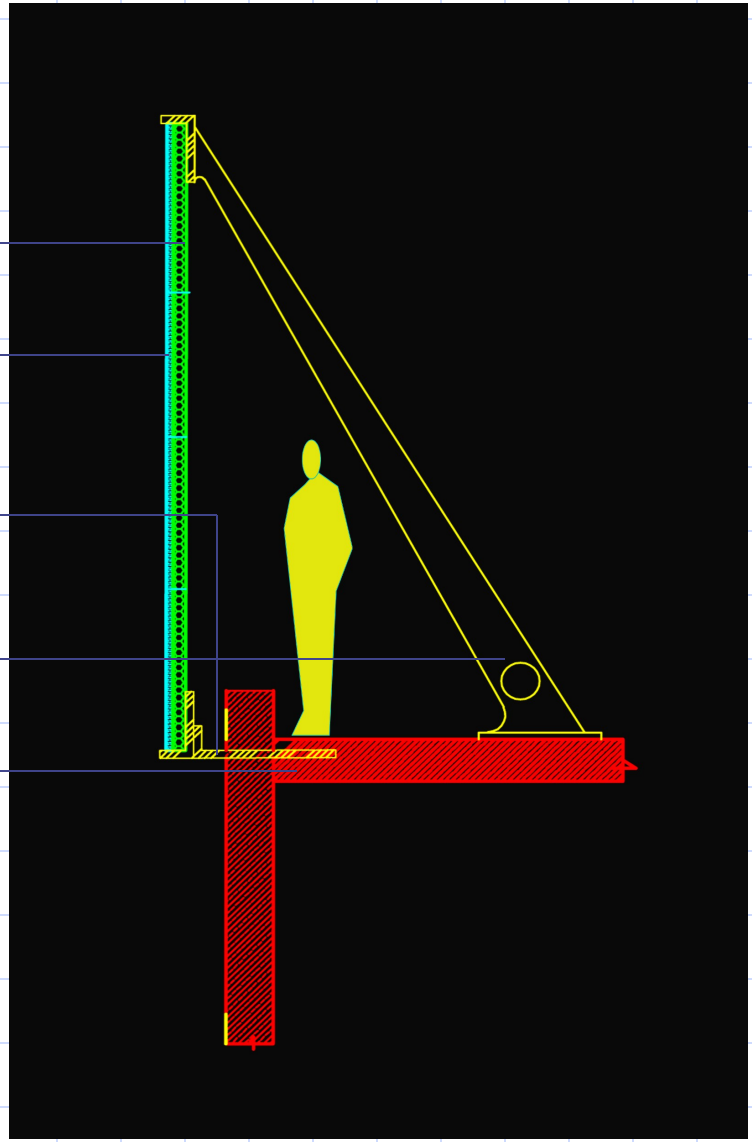
IPRO 323

DIAGRAMMATIC DETAIL OF BIPV INSTALLATION ON SUN SHADING ELEMENTS:

-INDEPENDENT STRUCTURE MOUNTED ON EXISTING MASONRY WALL CONNECTED TO STRUCTURE AND TROMBE WALL

-STRUCTURAL SYSTEM CAN BE USED TO SUPPORT WIND BREAKING ELEMENT AND WIND CATCHERS FOR INDEPENDENT BUILDING VENTILATION

-CONNECTED TO TROMBE WALL AND CURTAIN WALL IN PROGRAM SPACES



GROUP 2 12.05.03

IPRO 323

ROOF INSTALLED PV PANELS: SPECIFICATIONS

Module model	NT-167AK
Nominal power output (max.)	167 W
Nominal operating voltage (max.)	41.3 V
Nominal operating current (max.)	4.05 A
Nominal short-circuit current (max.)	4.4 A
Weight	14 kg (30.9 lbs)
Outside dimensions	1,200 x 802 x 55 mm (47" x 31.6" x 2.2")

Product name	High-efficiency single-crystal photovoltaic module
Nickname	SunVista
Model name	NT-167AK
Nominal power output (max.)	167 W
Module conversion efficiency	17.4%
Retail price (not including installation)	$1081.73

High-efficiency single-crystal photovoltaic module
<NT-167AK>

GROUP 2 12.05.03

IPRO 323

ROOF INSTALLED PV PANELS: SPECIFICATIONS

System designation		LN301-NT167AK	DUBAI 1908
Photovoltaic capacity		3.01 kW	1908 kW
PV modules	Model name	NT-167AK	NT-167AK
	Nominal power output (max.)	167 W	167 W
	Number of modules	18	11448
Power conditioner		JH-S304	JH-3500V x 546
Cables		SZJC20 x 4	SZJC20 x 2544
Area Covered		17.3 m^2	11,000 m^2

GROUP 2 12.05.03

INITIAL COST CALCULATIONS AND FEASIBILITY OF PV SCHEME:

Power Conditioners are used to produce electricity at a desired frequency at all times.

Approximate Total Cost for 11000 sqm (not including installation) =

$ 1,302,756.00 (for Power Conditioner, $2386.00 for each) +

$ 687,980.00 (for PV modules, $1081.30 for each) +

$ 88,786.00 (for cables, $34.90 for each)

= $ 2,079,522.00

Cost of Electricity in Dubai = $ 0.05 / kWh

The Installation will pay for itself in = 5 years (RUNNING 12 HRS A DAY)

With installation and other unforeseen problems, max payback period = 7 years