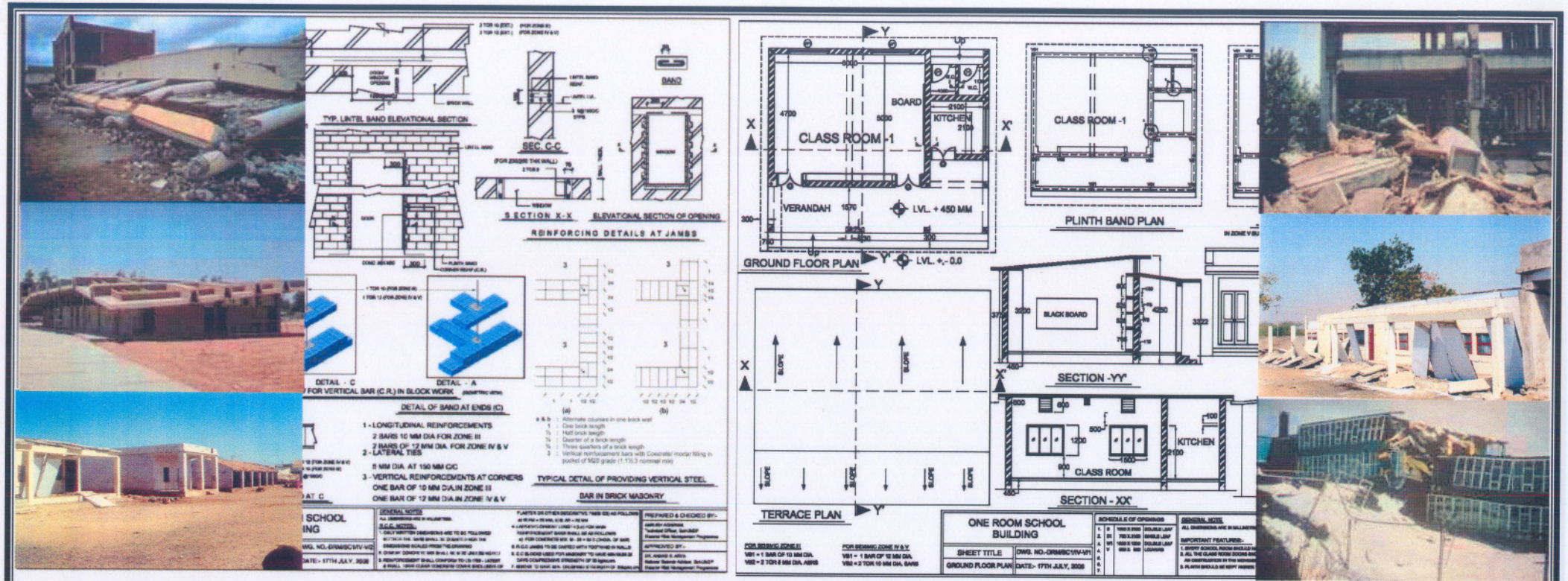


MODEL SCHOOL DESIGNS FOR CONSTRUCTION IN VARIOUS SEISMIC ZONES OF INDIA

Prepared Under

GoI – UNDP DISASTER RISK MANAGEMENT PROGRAMME

NEW DELHI

SEISMIC SAFETY OF SCHOOL BUILDINGS

Amongst all the public facilities children in schools are the most vulnerable during an earthquake disaster. A large number of schools managed by the education departments of the States as well as by private organizations operate in various urban and rural centers. Experience shows that rarely the school buildings are designed to be resistant to earthquake impacts. In the earthquake of 26th January, 2001 in Gujarat, more than 20000 school rooms were destroyed or severally damaged showing the inherent seismic weakness of the school buildings. Thousands of children perished due to collapse of the schools in this earthquake. In the recent earthquake which occurred in Jammu & Kashmir in 2005, more than 200 students & teachers lost their lives in the collapse of only one school building.

School buildings, wherever found safe either in earthquake, cyclone or flood disaster, are used for accommodating the homeless persons as temporary shelters. After the Kobe earthquake in Japan, the Ministry of Construction adopted a policy of upgrading all the school buildings to be used as shelters by retrofitting the unsafe buildings and upgrading their kitchen and drinking water facilities for that purpose.

We, in the Ministry of Home Affairs, had an opportunity of reviewing the primary school building designs of the Uttar Pradesh Government. None of the drawings indicated the provision of any earthquake resisting features. On our recommendations and details furnished, the UP Government has now modified all the school designs incorporating the seismic resisting features and upgrading the cost estimates so that *all new buildings* in the State in seismic Zones IV & III will have the earthquake safety built in the first instance.

Using the school plans of UP as the base, we have now prepared school building plans of one room, two rooms and four rooms in which further improvements have been incorporated such as two doors in every room and provision of toilets. Further more, we have incorporated the standard planning norms recommended in the National Building Code, 2005. It is hoped that these building plans along with all structural details, if adopted in all States & UT's in the various seismic zones will be a big forward step in creating a culture of prevention in the society, since, the primary schools, which are the closest to the community, may also be used as Technology Demonstration Units for the community which they can simulate in the construction of their own housing units.

The details of earthquake resisting elements furnished in these sample drawings can also be incorporated in other school plans which may have been developed by the States in their school building programmes.

Dr. Anand S. Arya
National Seismic Advisor
GoI – UNDP, DRM Programme

September 14th , 2006

SOME PLANNING NORMS FOR SCHOOL BUILDINGS

1. Room sizes to be in accordance with the State norms for school buildings
2. Height of the rooms should not be less 3.6 m for all regions in urban areas (NBC 2005, part – 3, pg.31) and minimum 3 m in rural areas.
3. Safety consideration: - Every class room to have 2 doors opening outside in a verandah or courtyard for easy exit.
4. For large two to three storey school buildings, there should be minimum two staircases with a width of 1.5 m opening into a large covered or open space.
5. Toilets need to be provided as per the National Building Code specification given below:-

   For urban areas:-

   - Minimum floor area of water closet should be 1.1 Sq.m. with a minimum width of 0.9 m (NBC 2005, part – 3, pg.31).
   - Minimum floor area of bath should be 1.8 Sq.m. with a minimum width of 1.2 m (NBC 2005, part – 3, pg.31).
   - Every bath of water closet shall have window or ventilator, opening to a shaft or open space, of area not less than 0.3 Sq.m. with side not less than 0.3 m (NBC 2005, part – 3, pg.31).
   - The height of a bathroom or water closet measured from the surface of the floor to the lowest point in the ceiling (bottom of slab) shall not be less than 2.1 m (NBC 2005, part – 3, pg.31).

   For low income rural areas:-

   - Minimum floor area of water closet should be 0.9 Sq.m. with a minimum width of 0.9 m (NBC 2005, part – 3, pg.58).
   - Minimum floor area of bath should be 1.2 Sq.m. with a minimum width of 1.0 m (NBC 2005, part – 3, pg.58).

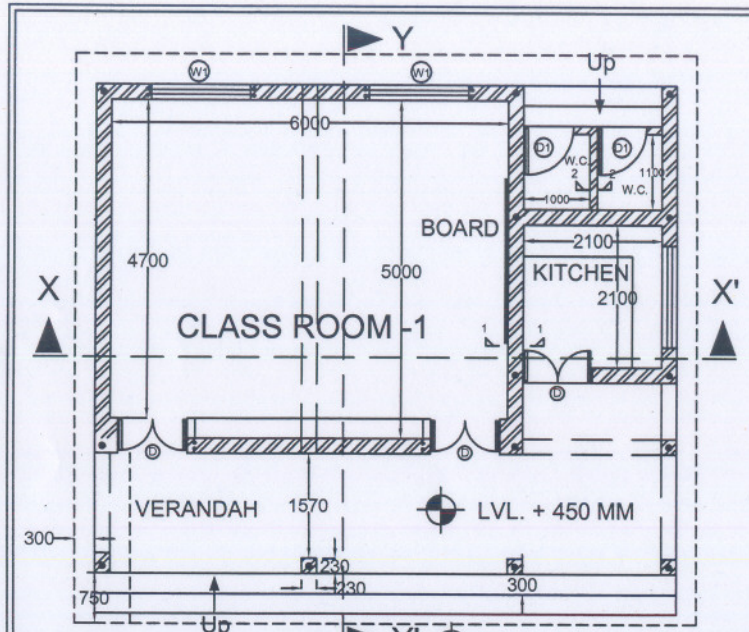
   No. of toilet fixtures required in school buildings

S.No.	Fixtures	Boys	Girls
a)	Water-closet	1 per 40 pupils or part thereof	1 per 25 pupils or part thereof
b)	Urinals	1 per 20 pupils or part thereof	-
c)	Drinking water Fountain or taps	1 per 50 pupils or part thereof	1 per 50 pupils or part thereof

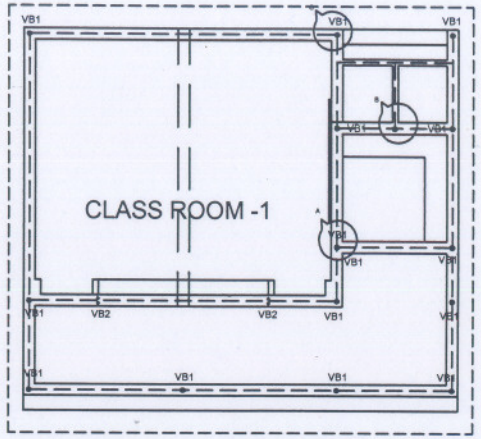
6. Preferably rain water harvesting may be included in large school buildings.
7. The buildings to be designed for earthquake, cyclonic wind resistance applicable as per IS Codes.
8. Plinth level of the school buildings to be kept atleast 15 cm above the known highest flood level, minimum 45 cm above the ground level.
9. In storm surge prone coastal areas either the whole school or the roof of the school made accessible through stairs should be kept higher than the estimated maximum flood inundation due to cyclonic rains/storm surges.

ONE ROOM SCHOOL BUILDING

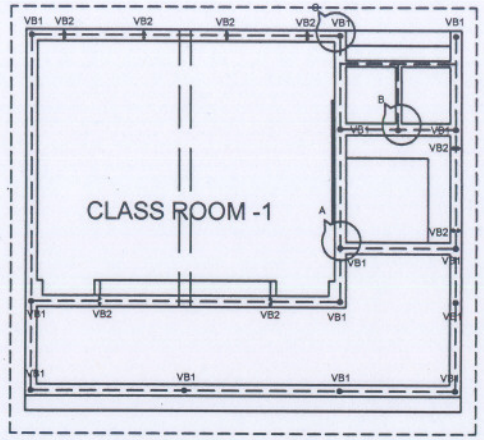
(With toilet & kitchen)



GROUND FLOOR PLAN

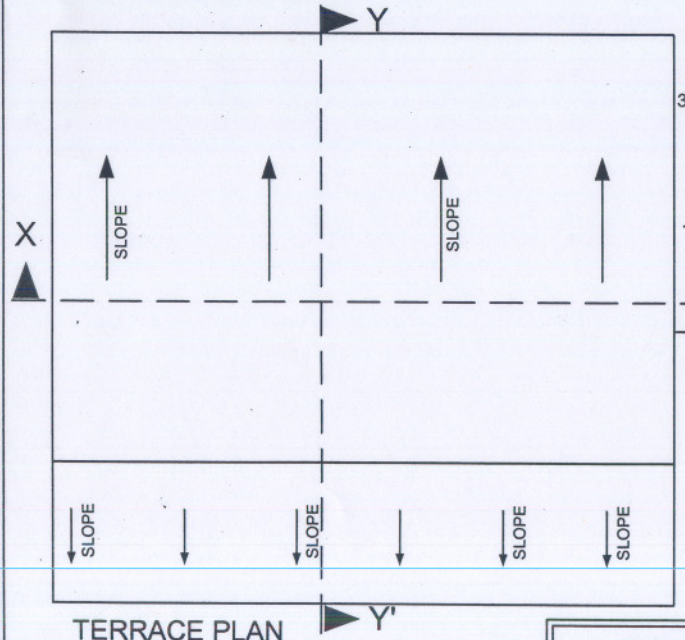


PLINTH BAND PLAN

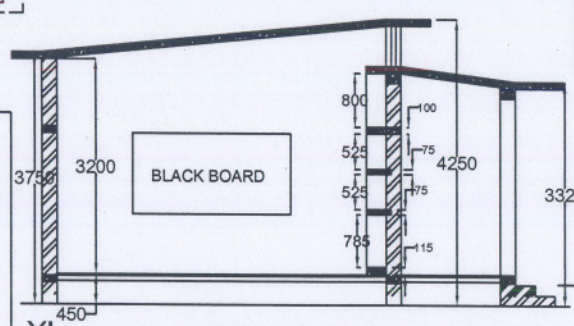


LINTEL BAND PLAN

IN ZONE V BUILDINGS ADD ADDITIONAL SEISMIC BAND AT SILL LEVEL

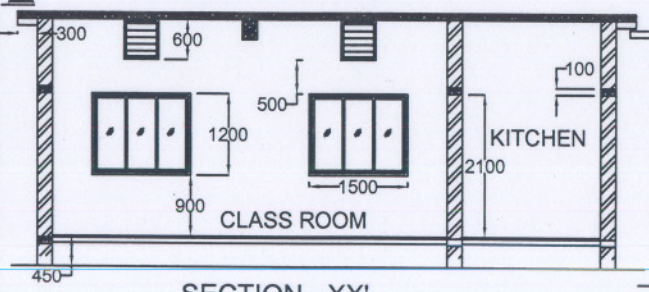


TERRACE PLAN

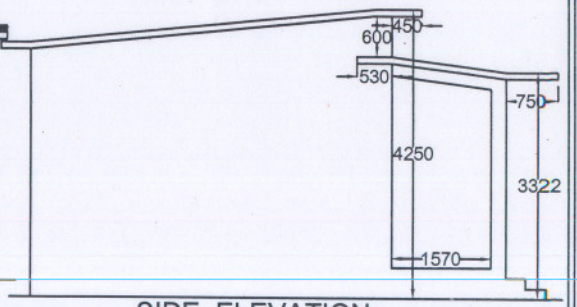


SECTION -YY'

FRONT ELEVATION



SECTION - XX'



SIDE ELEVATION

FOR SEISMIC ZONE III

VB1 = 1 BAR OF 10 MM DIA.
VB2 = 2 TOR 8 MM DIA. ABRS

FOR SEISMIC ZONE IV & V

VB1 = 1 BAR OF 12 MM DIA.
VB2 = 2 TOR 10 MM DIA. BARS

ONE ROOM SCHOOL BUILDING	
SHEET TITLE	DWG. NO.-DRM/SC1/IV-V/1
GROUND FLOOR PLAN	DATE:- 17TH JULY, 2006

SCHEDULE OF OPENINGS

1.	D	1050 X 2100	DOUBLE LEAF
2.	D1	750 X 2100	SINGLE LEAF
3.	W1	1500 X 1200	DOUBLE LEAF
4.	V	600 X 600	LOUVERS
5.			
6.			
7.			

GENERAL NOTE

ALL DIMENSIONS ARE IN MILLIMETRES.

IMPORTANT FEATURES:-

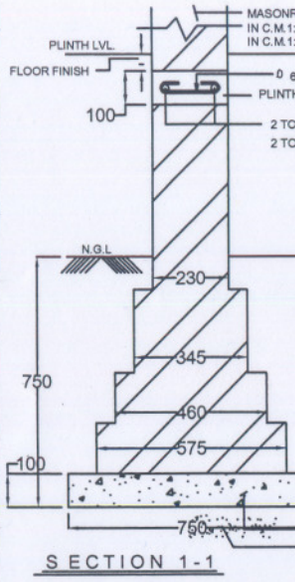
1. EVERY SCHOOL ROOM SHOULD HAVE 2 ENTRY/EXITS.
2. ALL THE CLASS ROOM DOORS SHOULD OPEN OUTSIDE AND SHOULD NOT CREATE AN OBSTRUCTION IN THE MOVEMENT IN FRONT CORRIDOR
3. PLINTH SHOULD BE KEPT HIGHER THAN HIGH FLOOD LEVEL AT THE SITE.

PREPARED & CHECKED BY:-

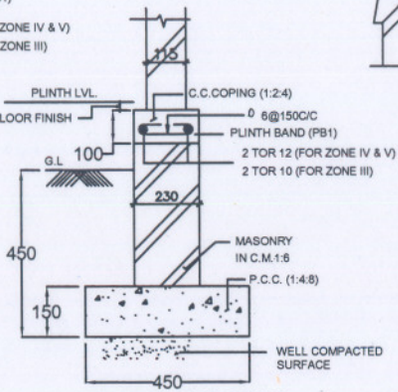
ANKUSH AGARWAL
Technical Officer, GoI-UNDP
Disaster Risk Management Programme

APPROVED BY:-

DR. ANAND S. ARYA
National Seismic Advisor, GoI-UNDP
Disaster Risk Management Programme

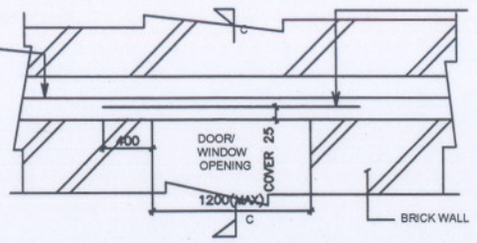


SECTION 1-1

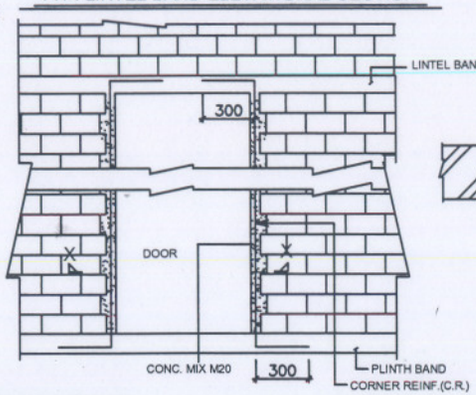


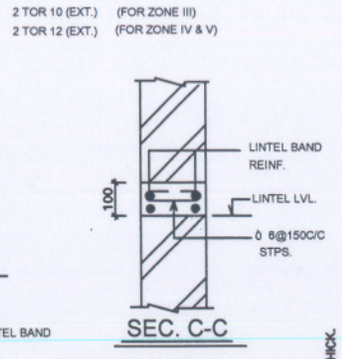
DWARF WALL FOOTING

SECTION 2-2

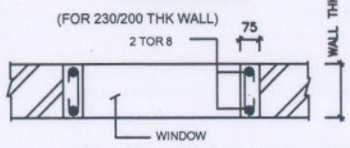


TYP. LINTEL BAND ELEVATIONAL SECTION

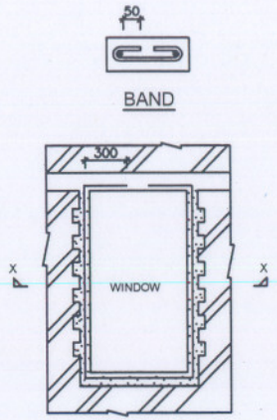




SEC. C-C

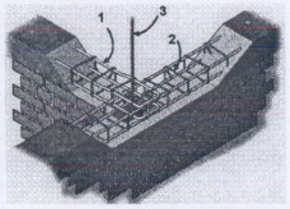


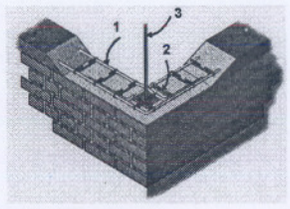
SECTION X-X



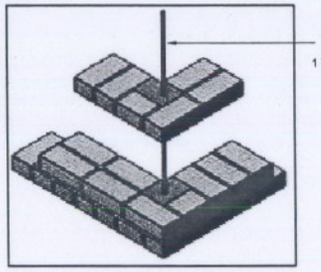
ELEVATIONAL SECTION OF OPENING

REINFORCING DETAILS AT JAMBS

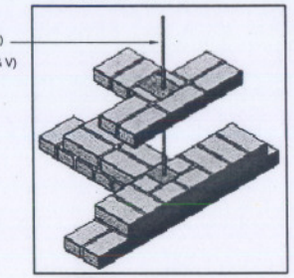




3 DIMENSIONAL VIEW OF THE L & T - TYPE WALL JUNCTION

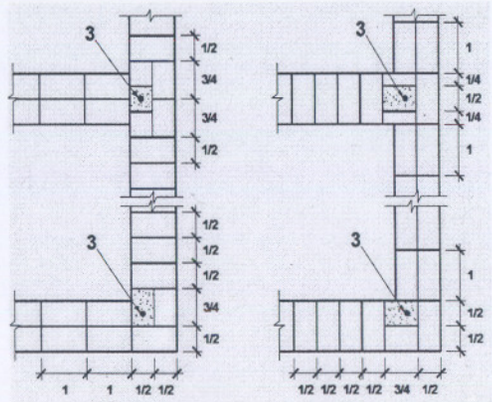


DETAIL - C



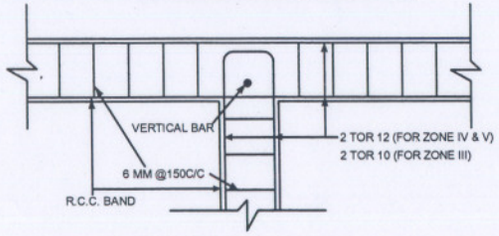
DETAIL - A

VIEW FOR VERTICAL BAR (C.R.) IN BLOCK WORK (ISOMETRIC VIEW)

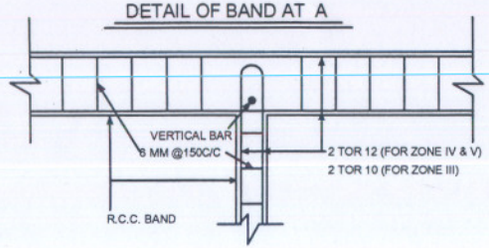


a & b : Alternate courses in one brick wall
1 : One brick length
½ : Half brick length
¼ : Quarter of a brick length
¾ : Three quarters of a brick length
3 : Vertical reinforcement bars with Concrete/ mortar filling in pocket of M20 grade (1:1½:3 nominal mix)

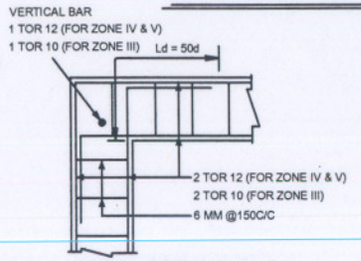
TYPICAL DETAIL OF PROVIDING VERTICAL STEEL BAR IN BRICK MASONRY



DETAIL OF BAND AT A



DETAIL OF BAND AT B



DETAIL OF BAND AT C

DETAIL OF BAND AT ENDS (C)

1 - LONGITUDINAL REINFORCEMENTS
2 BARS 10 MM DIA FOR ZONE III
2 BARS OF 12 MM DIA. FOR ZONE IV & V
2 - LATERAL TIES
6 MM DIA. AT 150 MM C/C
3 - VERTICAL REINFORCEMENTS AT CORNERS
ONE BAR OF 10 MM DIA.IN ZONE III
ONE BAR OF 12 MM DIA.IN ZONE IV & V

ONE ROOM SCHOOL BUILDING

SHEET TITLE	DWG. NO.-DRM/SC1/IV-V/2
DETAILS	DATE:- 17TH JULY, 2006

GENERAL NOTES

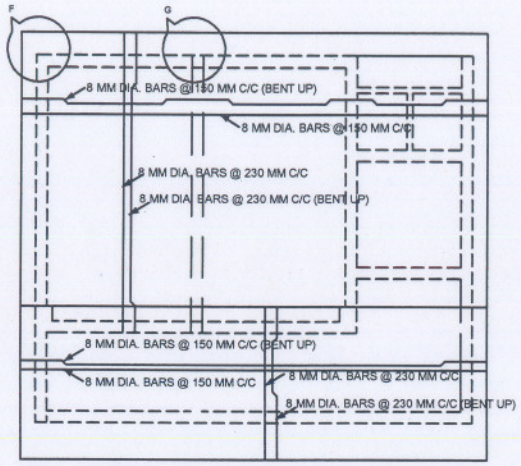
ALL DIMENSIONS ARE IN MILLIMETRES.

R.C.C. NOTES:-

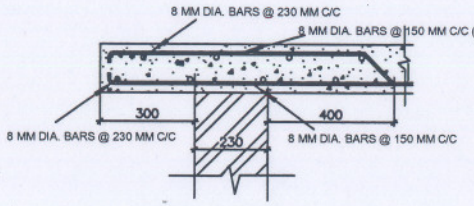
1. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED NEITHER THE BARS SHALL BE COUNTED NOR THE DIMENSIONS SCALED FROM THE DRAWING
2. CEMENT CONCRETE MIX SHALL BE M-20 UNLESS NOTED
3. REINFORCEMENT SHALL CONFORM TO I.S:1786 - LATEST & SHALL HAVE CLEAR CONCRETE COVER (EXCLUSIVE OF PLASTER OR OTHER DECORATIVE FINISHES) AS FOLLOWS:
   a) BEAM = 25 MM, b) SLAB = 20 MM
4. LAP/DEVELOPMENT LENGTH (Ld) FOR MAIN REINFORCEMENT BARS SHALL BE AS FOLLOWS:
   a) FOR CONCRETE MIX M - 20 = 50 D (D=DIA. OF BAR)
5. R.C.C JAMBS TO BE CASTED WITH TOOTHING IN WALLS
6. C.C BLOCKS USED FOR MASONRY TO HAVE MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF 50 kg/sq.cm.
7. BRICKS TO HAVE MIN. CRUSHING STRENGTH OF 50kg/sq.cm.

PREPARED & CHECKED BY:-
ANKUSH AGARWAL
Technical Officer, GoI-UNDP
Disaster Risk Management Programme

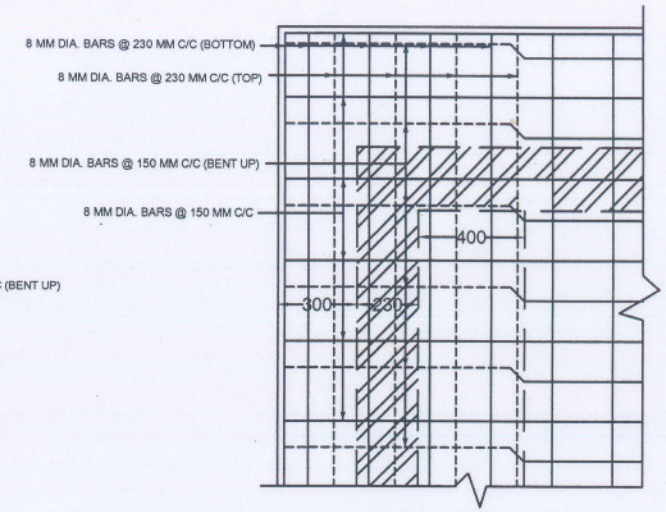
APPROVED BY:-
DR. ANAND S. ARYA
National Seismic Advisor, GoI-UNDP
Disaster Risk Management Programme



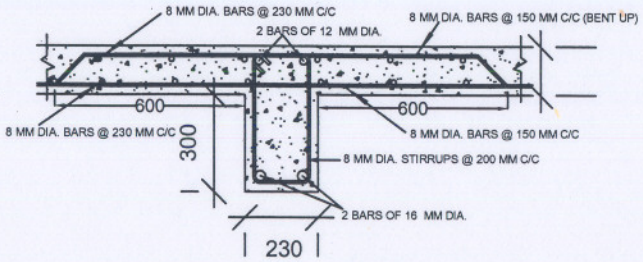
SLAB REINFORCEMENT DETAIL PLAN



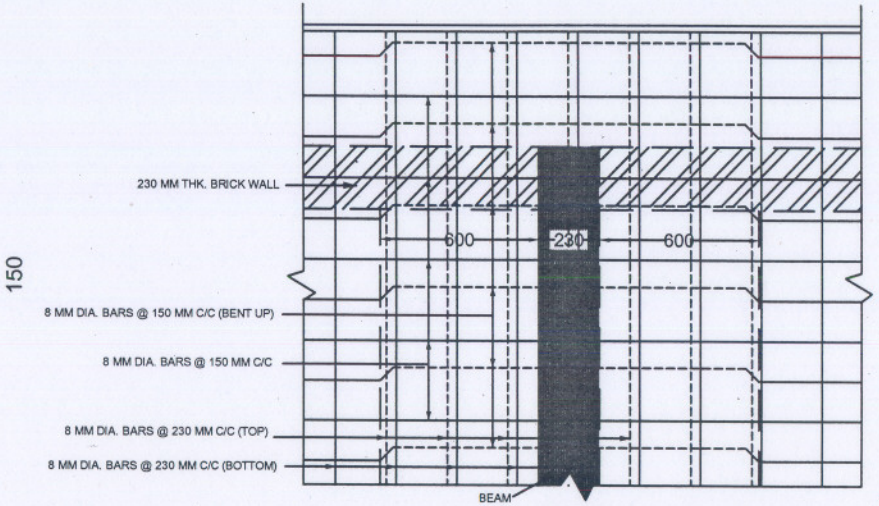
ENLARGED DETAIL AT E



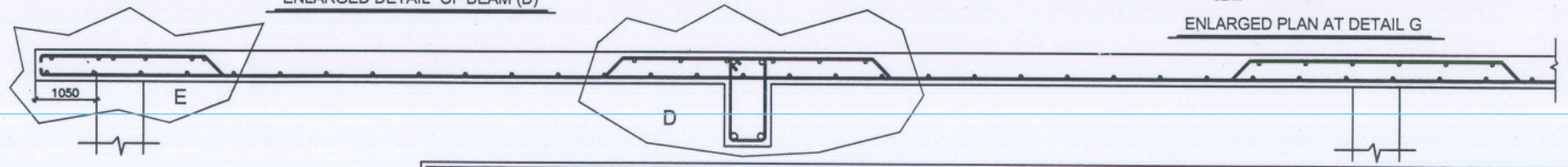
ENLARGED PLAN AT DETAIL F



ENLARGED DETAIL OF BEAM (D)



ENLARGED PLAN AT DETAIL G



PART LONGITUDINAL SECTION OF SLAB

REINFORCEMENT DETAILS

ONE ROOM SCHOOL BUILDING	
SHEET TITLE	DWG. NO.-DRM/SC2/IV-V/3
DETAILS	DATE:- 17TH JULY, 2006

GENERAL NOTES

ALL DIMENSIONS ARE IN MILLIMETRES.

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2. CEMENT CONCRETE MIX SHALL BE M-20 UNLESS NOTED
3. REINFORCEMENT SHALL CONFORM TO I.S:1786 - LATEST & SHALL HAVE CLEAR CONCRETE COVER (EXCLUSIVE OF PLASTER OR OTHER DECORATIVE FINISHES) AS FOLLOWS: a) BEAM = 25 MM, b) SLAB = 20 MM
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PREPARED & CHECKED BY:-

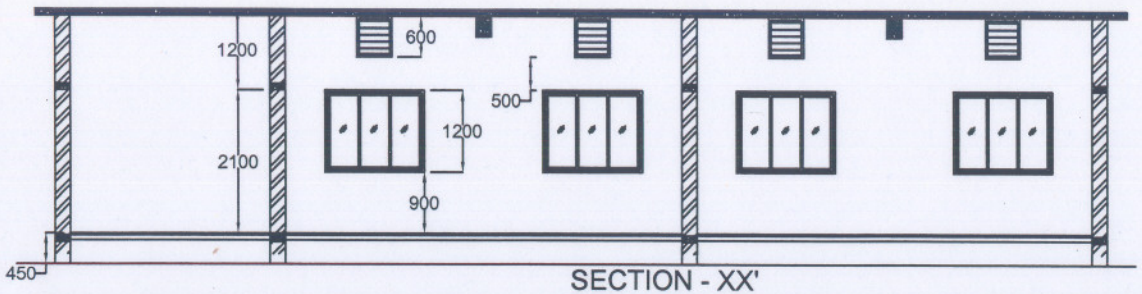
ANKUSH AGARWAL
Technical Officer, GoI-UNDP
Disaster Risk Management Programme

APPROVED BY:-

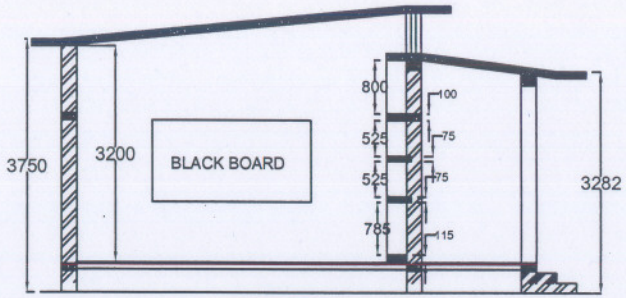
DR. ANAND S. ARYA
National Seismic Advisor, GoI-UNDP
Disaster Risk Management Programme

TWO ROOM SCHOOL BUILDING

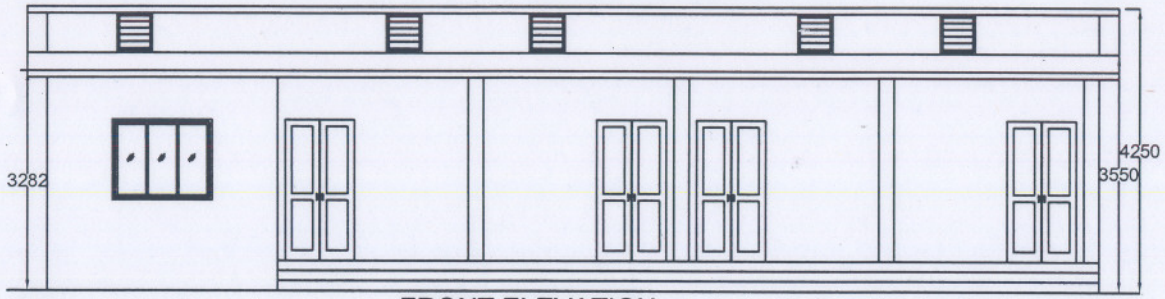
(With head master room & toilet)



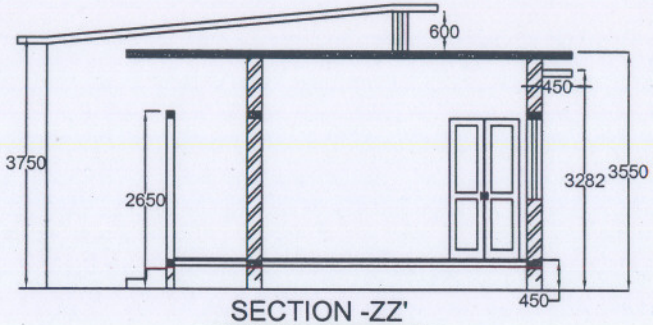
SECTION - XX'



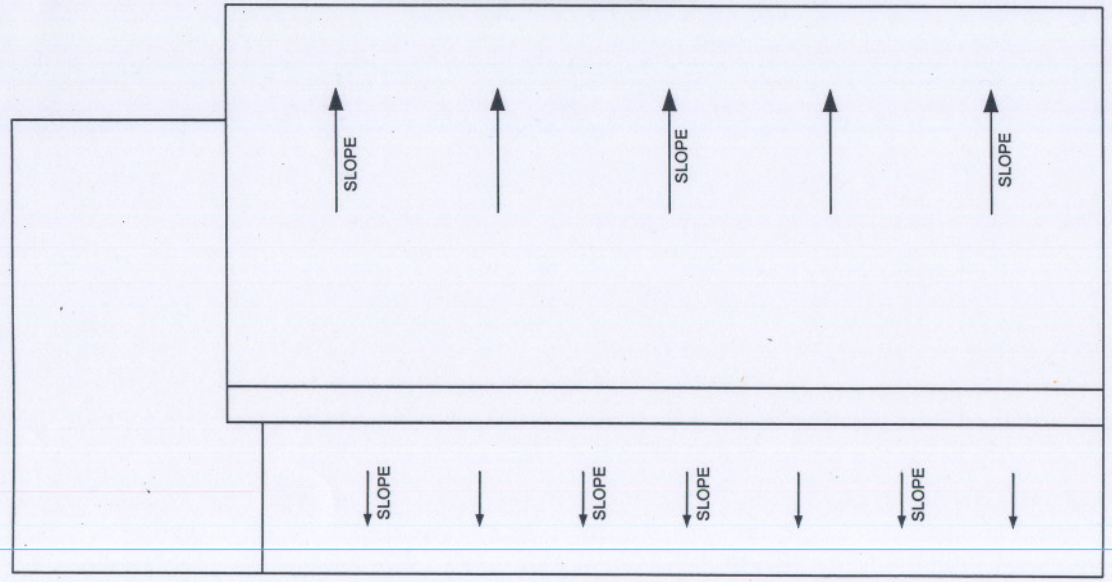
SECTION -YY'



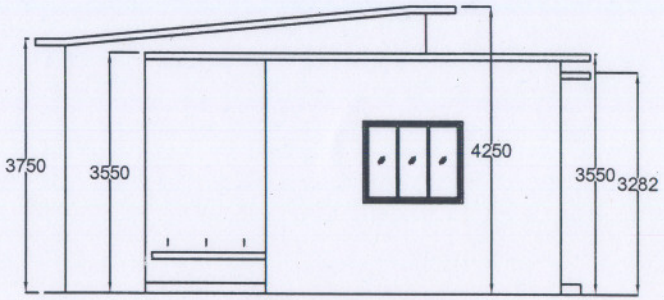
FRONT ELEVATION



SECTION -ZZ'



ROOF PLAN



SIDE ELEVATION

TWO ROOM SCHOOL BUILDING	
SHEET TITLE	DWG. NO.-DRM/SC2/IV-V/2
ELEV/SEC/ROOF PLAN	DATE:- 17TH JULY, 2006

SCHEDULE OF OPENINGS

1.	D	1050 X 2100	DOUBLE LEAF
2.	D1	1050 X 2100	SINGLE LEAF
3.	D2	900 X 2100	SINGLE LEAF
4.	D3	750 X 2100	SINGLE LEAF
5.	W1	1500 X 1200	DOUBLE LEAF
6.	V	600 X 600	LOUVERS
7.			

GENERAL NOTE

ALL DIMENSIONS ARE IN MILLIMETRES.

IMPORTANT FEATURES:-

1. EVERY SCHOOL ROOM SHOULD HAVE 2 ENTRY/EXITS.
2. ALL THE CLASS ROOM DOORS SHOULD OPEN OUTSIDE AND SHOULD NOT CREATE AN OBSTRUCTION IN THE MOVEMENT IN FRONT CORRIDOR
3. PLINTH SHOULD BE KEPT HIGHER THAN HIGH FLOOD LEVEL AT THE SITE.

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National Seismic Advisor, GoI-UNDP
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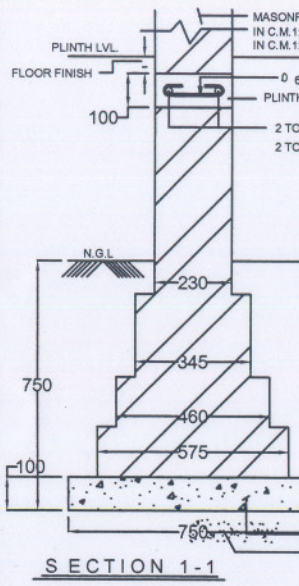
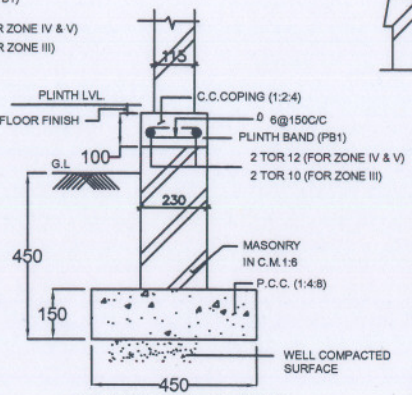
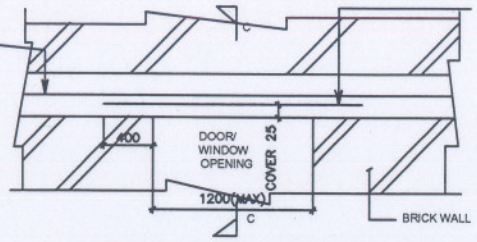


SECTION 1-1

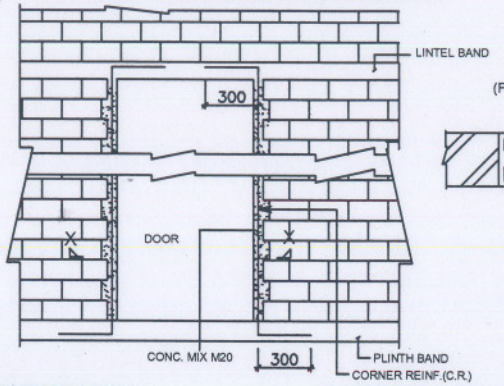


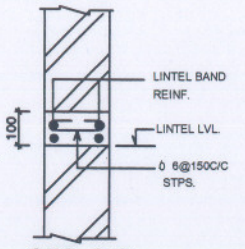
DWARF WALL FOOTING

SECTION 2-2

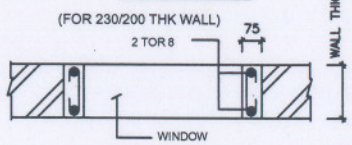


TYP. LINTEL BAND ELEVATIONAL SECTION

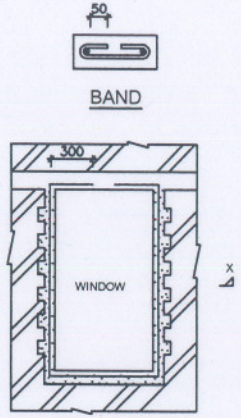




SEC. C-C

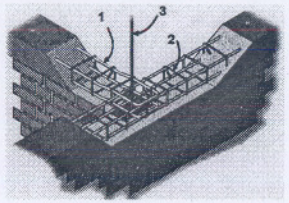


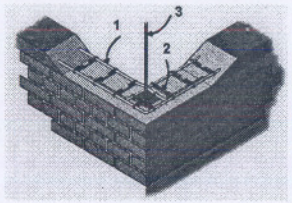
SECTION X-X



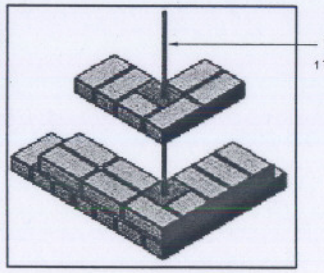
ELEVATIONAL SECTION OF OPENING

REINFORCING DETAILS AT JAMBS

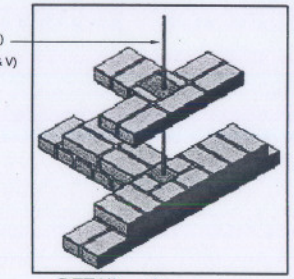




3 DIMENSIONAL VIEW OF THE L & T - TYPE WALL JUNCTION

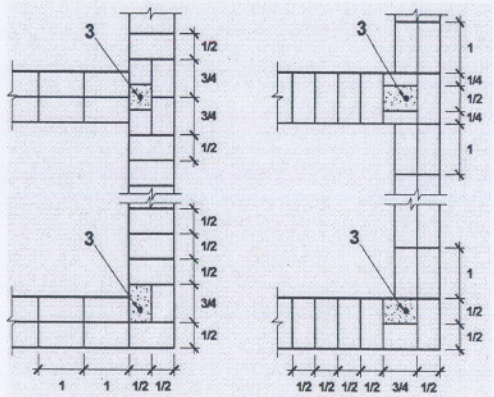


DETAIL - C



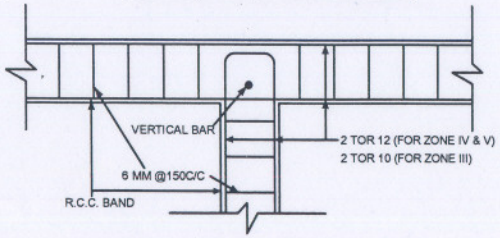
DETAIL - A

VIEW FOR VERTICAL BAR (C.R.) IN BLOCK WORK (ISOMETRIC VIEW)

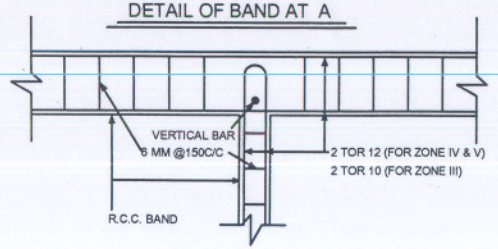


a & b : Alternate courses in one brick wall
1 : One brick length
½ : Half brick length
¼ : Quarter of a brick length
¾ : Three quarters of a brick length
3 : Vertical reinforcement bars with Concrete/ mortar filling in pocket of M20 grade (1:1½:3 nominal mix)

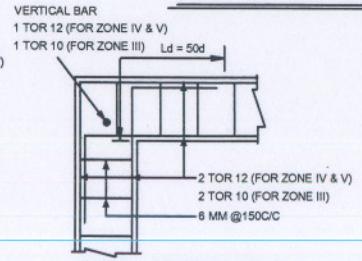
TYPICAL DETAIL OF PROVIDING VERTICAL STEEL BAR IN BRICK MASONRY



DETAIL OF BAND AT A



DETAIL OF BAND AT B



DETAIL OF BAND AT C

DETAIL OF BAND AT ENDS (C)

1 - LONGITUDINAL REINFORCEMENTS
2 BARS 10 MM DIA FOR ZONE III
2 BARS OF 12 MM DIA. FOR ZONE IV & V
2 - LATERAL TIES
6 MM DIA. AT 150 MM C/C
3 - VERTICAL REINFORCEMENTS AT CORNERS
ONE BAR OF 10 MM DIA.IN ZONE III
ONE BAR OF 12 MM DIA.IN ZONE IV & V

TWO ROOM SCHOOL BUILDING

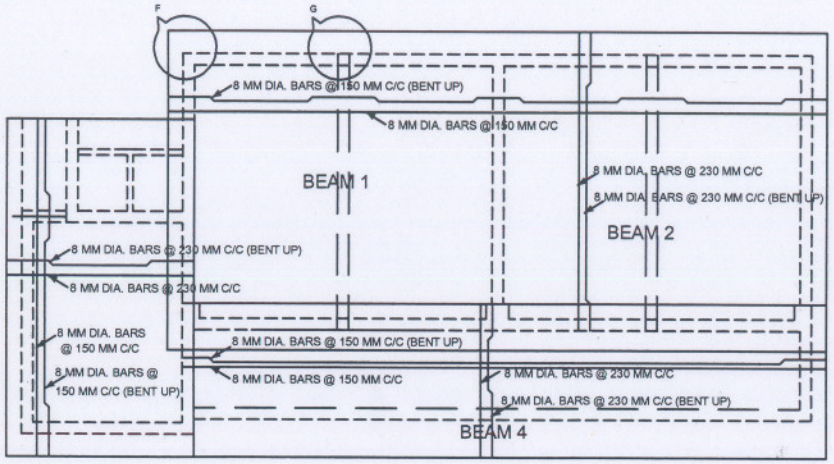
SHEET TITLE	DWG. NO.-DRM/SC2/IV-V/3
DETAILS	DATE:- 17TH JULY, 2006

GENERAL NOTES
ALL DIMENSIONS ARE IN MILLIMETRES.

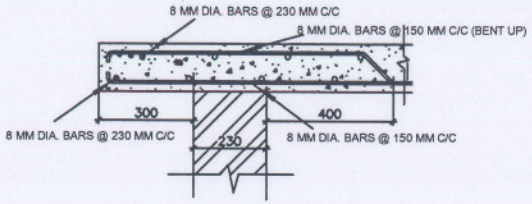
R.C.C. NOTES:-
1. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED NEITHER THE BARS SHALL BE COUNTED NOR THE DIMENSIONS SCALED FROM THE DRAWING
2. CEMENT CONCRETE MIX SHALL BE M-20 UNLESS NOTED
3. REINFORCEMENT SHALL CONFORM TO I.S:1786 - LATEST & SHALL HAVE CLEAR CONCRETE COVER (EXCLUSIVE OF PLASTER OR OTHER DECORATIVE FINISHES) AS FOLLOWS:
a) BEAM = 25 M/M, b) SLAB = 20 MM
4. LAP/DEVELOPMENT LENGTH (Ld) FOR MAIN REINFORCEMENT BARS SHALL BE AS FOLLOWS:
a) FOR CONCRETE MIX M - 20 = 50 D (D=DIA. OF BAR)
5. R.C.C JAMBS TO BE CASTED WITH TOOTHING IN WALLS
6. C.C BLOCKS USED FOR MASONRY TO HAVE MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF 50 kg/sq.cm.
7. BRICKS TO HAVE MIN. CRUSHING STRENGTH OF 50kg/sq.cm

PREPARED & CHECKED BY:-
ANKUSH AGARWAL
Technical Officer, GoI-UNDP
Disaster Risk Management Programme

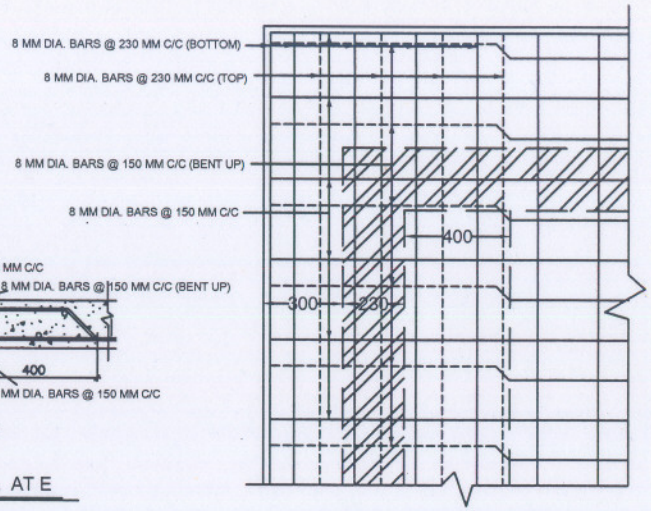
APPROVED BY:-
DR. ANAND S. ARYA
National Seismic Advisor, GoI-UNDP
Disaster Risk Management Programme



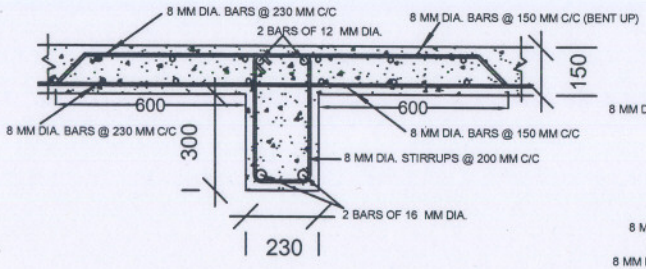
SLAB REINFORCEMENT DETAIL PLAN



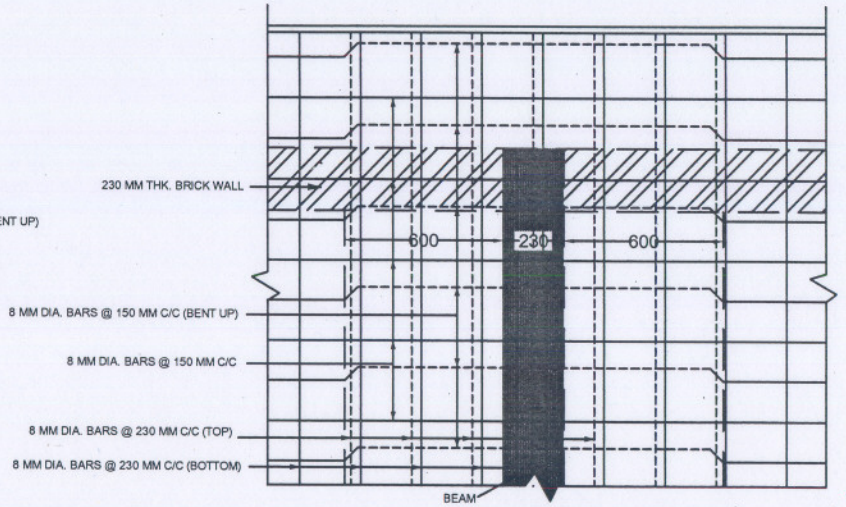
ENLARGED DETAIL AT E



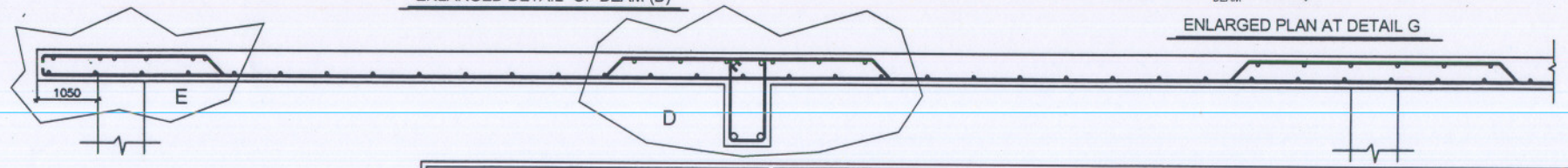
ENLARGED PLAN AT DETAIL F



ENLARGED DETAIL OF BEAM (D)



ENLARGED PLAN AT DETAIL G



PART LONGITUDINAL SECTION OF SLAB

REINFORCEMENT DETAILS

TWO ROOM SCHOOL BUILDING

SHEET TITLE	DWG. NO.-DRM/SC2/IV-V/4
DETAILS	DATE:- 17TH JULY, 2006

GENERAL NOTES

ALL DIMENSIONS ARE IN MILLIMETRES.

R.C.C. NOTES:-

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Technical Officer, GoI-UNDP
Disaster Risk Management Programme

APPROVED BY:-

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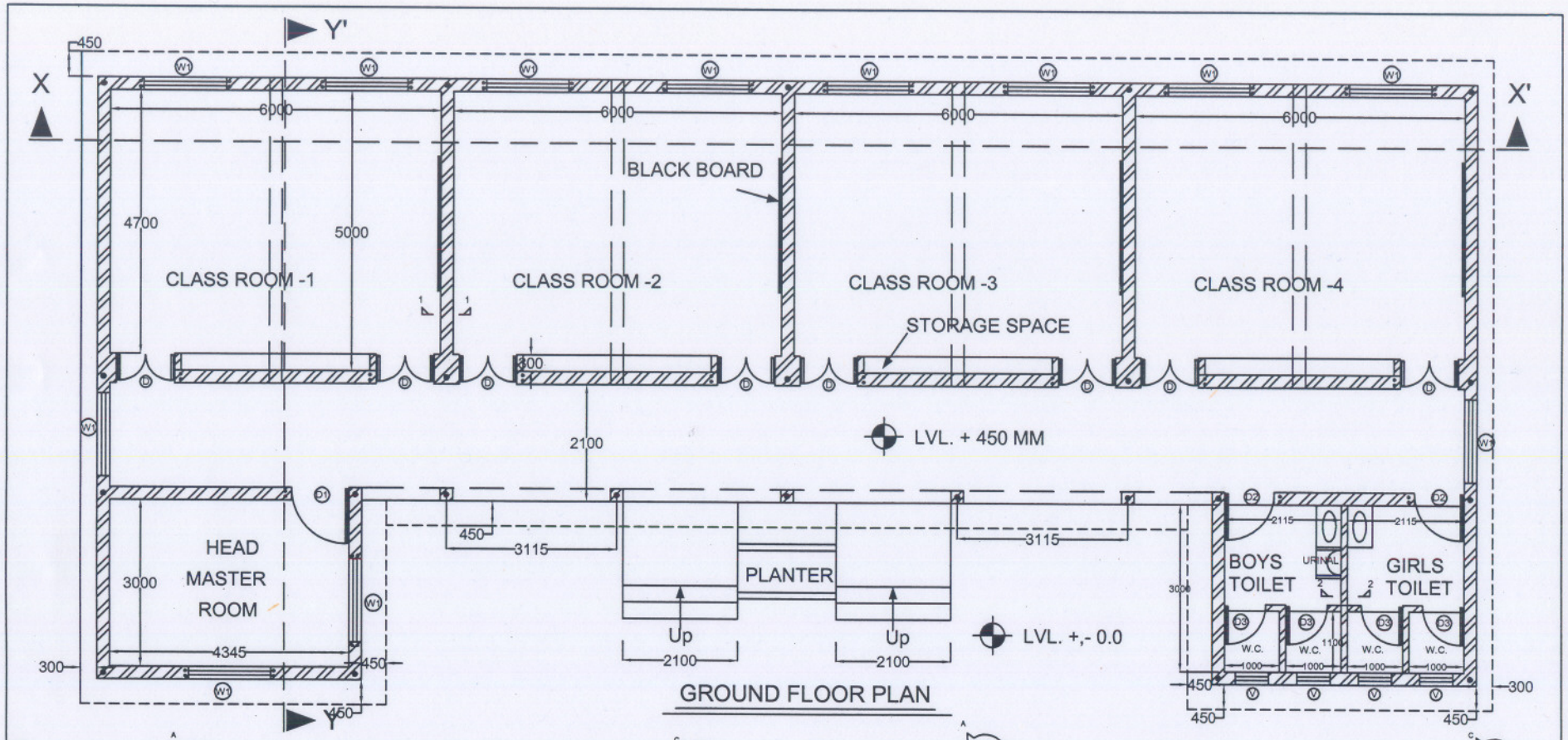
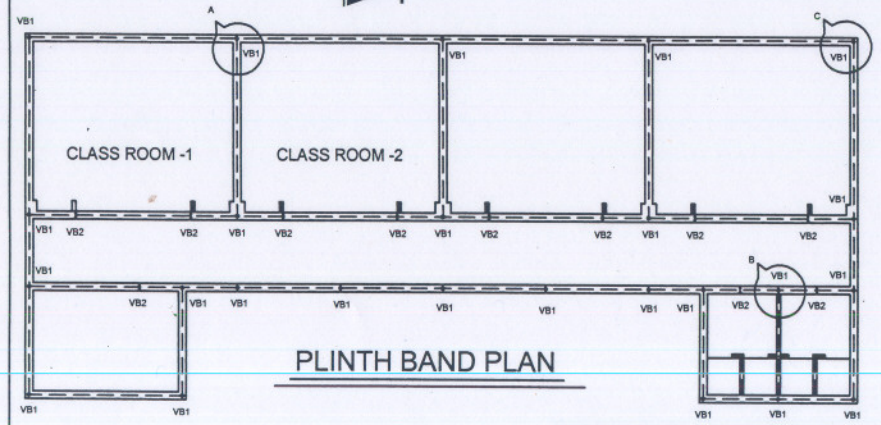
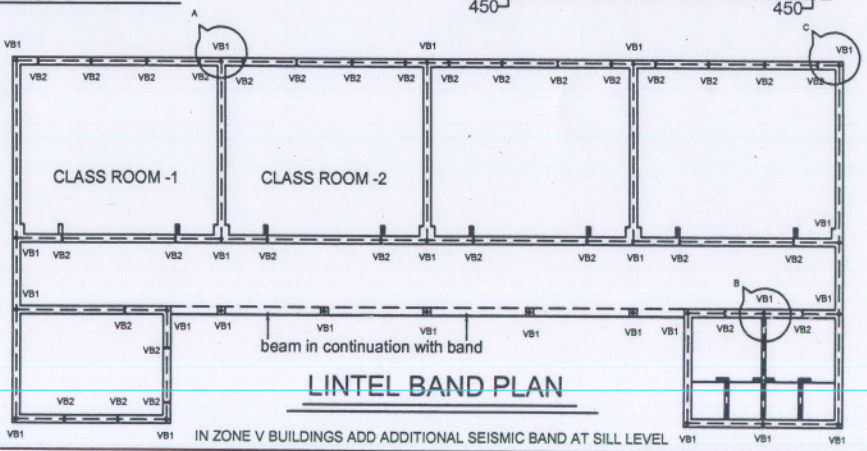
National Seismic Advisor, GoI-UNDP
Disaster Risk Management Programme

FOUR ROOM SCHOOL BUILDING

(With head master room & toilet)







IN ZONE V BUILDINGS ADD ADDITIONAL SEISMIC BAND AT SILL LEVEL

FOR SEISMIC ZONE III
VB1 = 1 BAR OF 10 MM DIA.
VB2 = 2 TOR 8 MM DIA. ABRS

FOR SEISMIC ZONE IV & V
VB1 = 1 BAR OF 12 MM DIA.
VB2 = 2 TOR 10 MM DIA. BARS

FOUR ROOM SCHOOL BUILDING

SHEET TITLE	DWG. NO.-DRM/SC4/IV-V/1
GROUND FLOOR PLAN	DATE:- 17TH JULY, 2006

SCHEDULE OF OPENINGS

1.	D	1050 X 2100	DOUBLE LEAF
2.	D1	1050 X 2100	SINGLE LEAF
3.	D2	900 X 2100	SINGLE LEAF
4.	D3	750 X 2100	SINGLE LEAF
5.	W1	1500 X 1200	DOUBLE LEAF
6.	V	600 X 600	LOUVERS
7.			

GENERAL NOTE
ALL DIMENSIONS ARE IN MILLIMETRES.

IMPORTANT FEATURES:-
1. EVERY SCHOOL ROOM SHOULD HAVE 2 ENTRY/EXITS.
2. ALL THE CLASS ROOM DOORS SHOULD OPEN OUTSIDE AND SHOULD NOT CREATE AN OBSTRUCTION IN THE MOVEMENT IN FRONT CORRIDOR
3. PLINTH SHOULD BE KEPT HIGHER THAN HIGH FLOOD LEVEL AT THE SITE.

PREPARED & CHECKED BY:-
ANKUSH AGARWAL
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Disaster Risk Management Programme

APPROVED BY:-
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National Seismic Advisor, GoI-UNDP
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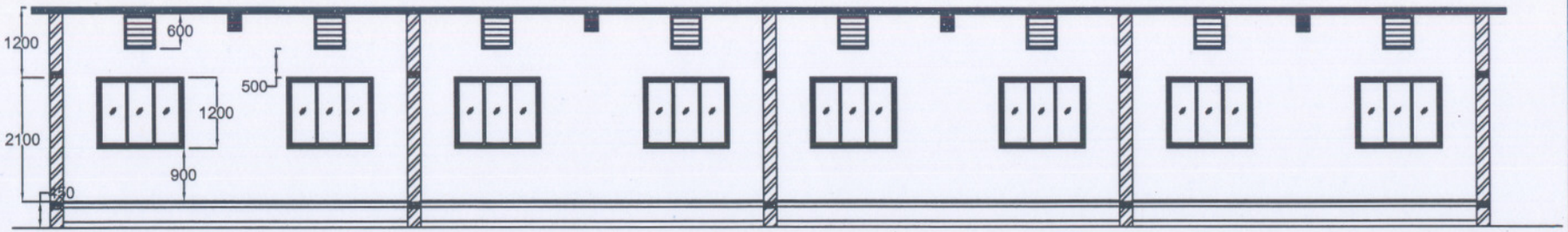
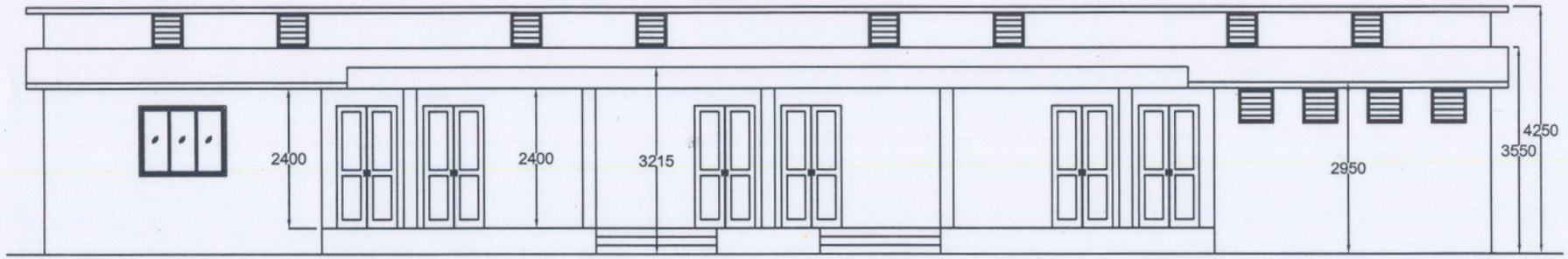
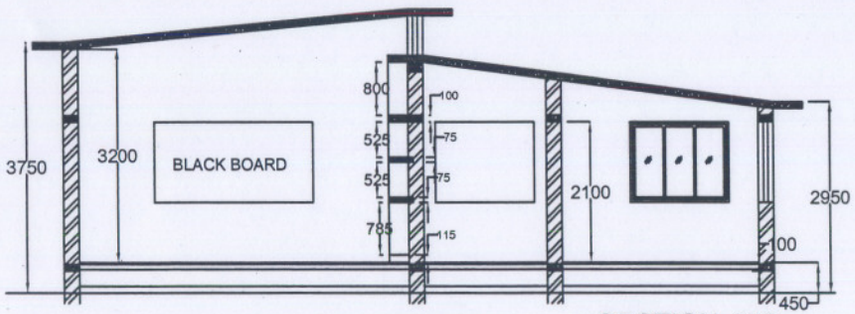


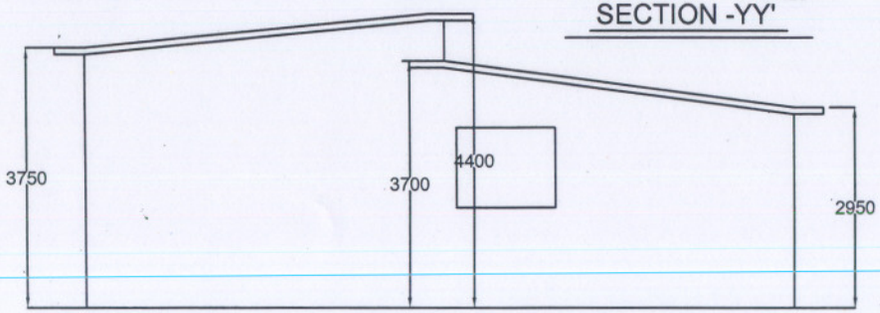
SECTION - XX'



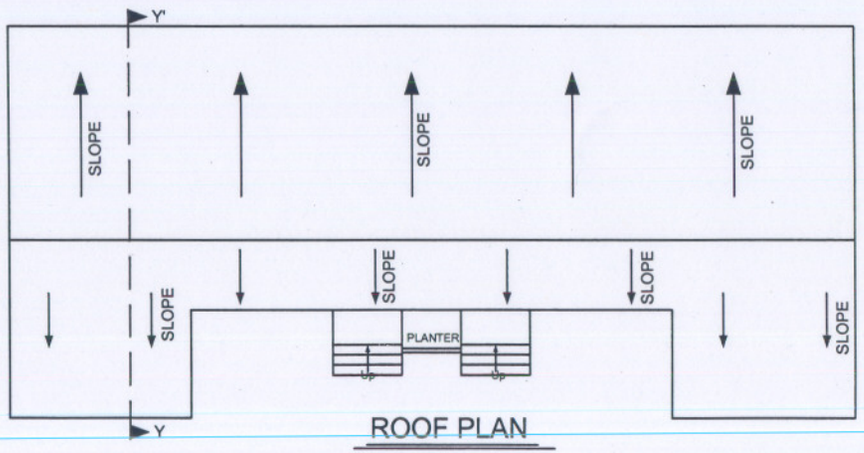
FRONT ELEVATION



SECTION -YY'



SIDE ELEVATION



ROOF PLAN

FOUR ROOM SCHOOL BUILDING	
SHEET TITLE	DWG. NO.-DRM/SC4/IV-V/2
ELEV/SEC/ROOF PLAN	DATE:- 17TH JULY, 2006

SCHEDULE OF OPENINGS

1.	D	1050 X 2100	DOUBLE LEAF
2.	D1	1050 X 2100	SINGLE LEAF
3.	D2	900 X 2100	SINGLE LEAF
4.	D3	750 X 2100	SINGLE LEAF
5.	W1	1500 X 1200	DOUBLE LEAF
6.	V	600 X 600	LOUVERS
7.			

GENERAL NOTE

ALL DIMENSIONS ARE IN MILLIMETRES.

IMPORTANT FEATURES:-

1. EVERY SCHOOL ROOM SHOULD HAVE 2 ENTRY/EXITS.
2. ALL THE CLASS ROOM DOORS SHOULD OPEN OUTSIDE AND SHOULD NOT CREATE AN OBSTRUCTION IN THE MOVEMENT IN FRONT CORRIDOR
3. PLINTH SHOULD BE KEPT HIGHER THAN HIGH FLOOD LEVEL AT THE SITE.

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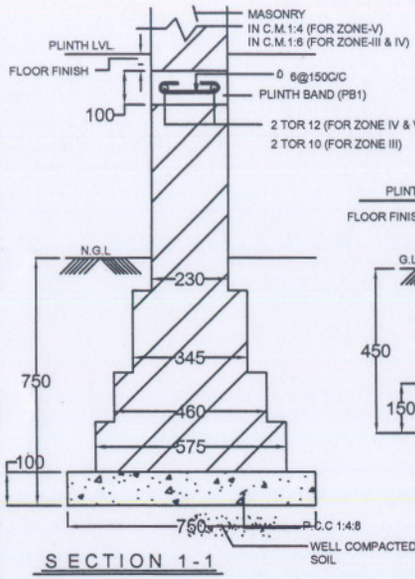
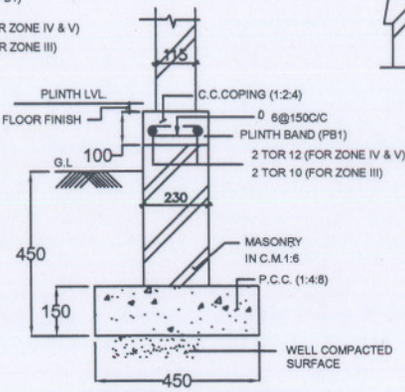
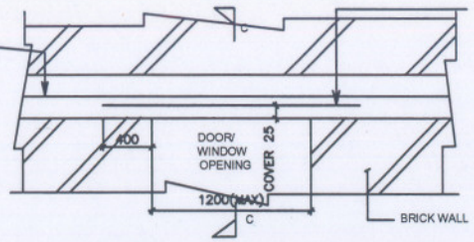


S E C T I O N 1 - 1

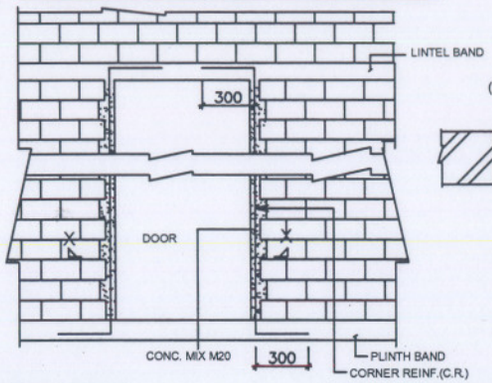


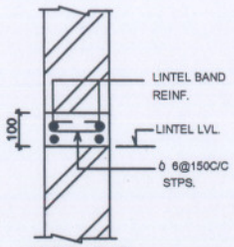
DWARF WALL FOOTING

S E C T I O N 2 - 2

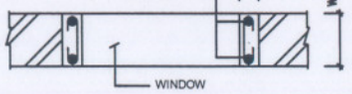


TYP. LINTEL BAND ELEVATIONAL SECTION

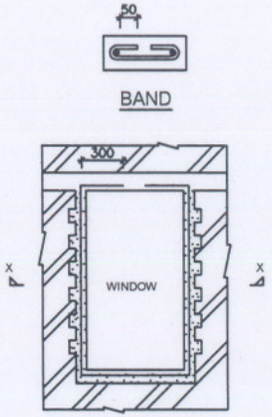




SEC. C-C

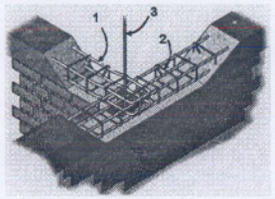


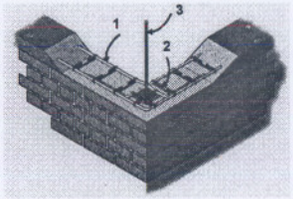
S E C T I O N X - X



ELEVATIONAL SECTION OF OPENING

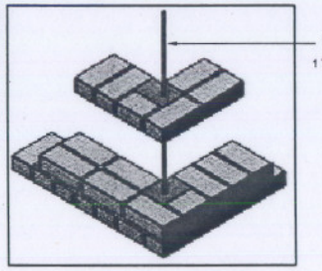
REINFORCING DETAILS AT JAMBS



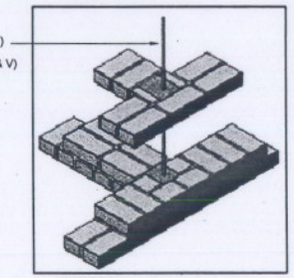


3 DIMENSIONAL VIEW OF THE L &

T - TYPE WALL JUNCTION



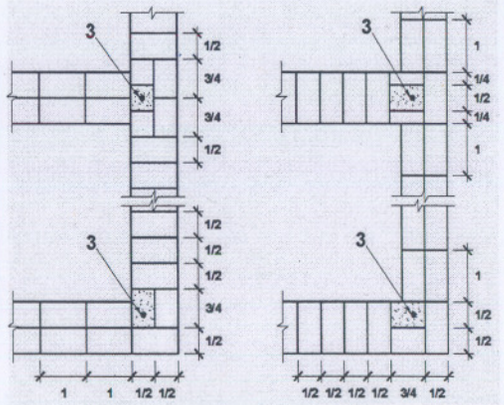
DETAIL - C



DETAIL - A

1 TOR 10 (FOR ZONE III)
1 TOR 12 (FOR ZONE IV & V)

VIEW FOR VERTICAL BAR (C.R.) IN BLOCK WORK (ISOMETRIC VIEW)



a & b : Alternate courses in one brick wall
1 : One brick length
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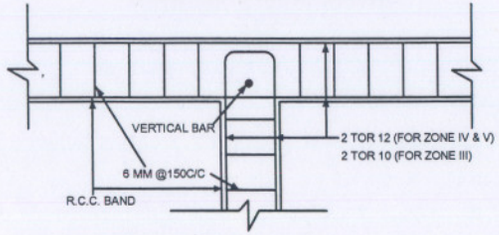
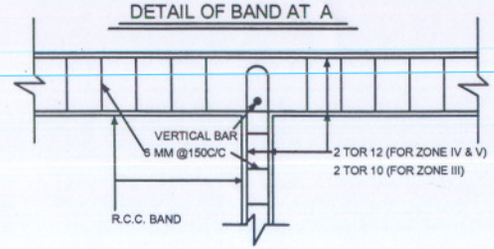
3 : Vertical reinforcement bars with Concrete/ mortar filling in pocket of M20 grade (1:1½:3 nominal mix)

TYPICAL DETAIL OF PROVIDING VERTICAL STEEL

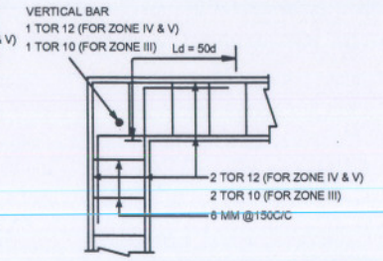
BAR IN BRICK MASONRY



DETAIL OF BAND AT A



DETAIL OF BAND AT B



DETAIL OF BAND AT ENDS (C)

1 - LONGITUDINAL REINFORCEMENTS
2 BARS 10 MM DIA FOR ZONE III
2 BARS OF 12 MM DIA. FOR ZONE IV & V
2 - LATERAL TIES
6 MM DIA. AT 150 MM C/C
3 - VERTICAL REINFORCEMENTS AT CORNERS
ONE BAR OF 10 MM DIA.IN ZONE III
ONE BAR OF 12 MM DIA.IN ZONE IV & V

FOUR ROOM SCHOOL BUILDING

SHEET TITLE	DWG. NO.-DRM/SC4/IV-V/3
DETAILS	DATE:- 17TH JULY, 2006

GENERAL NOTES

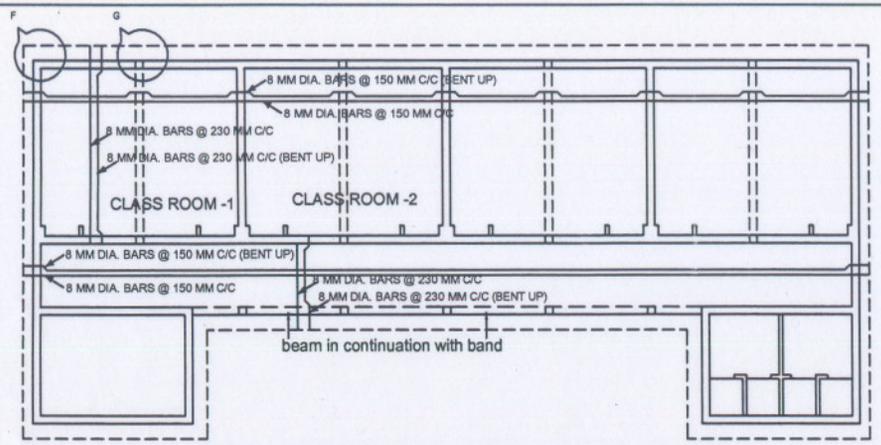
ALL DIMENSIONS ARE IN MILLIMETRES.

R.C.C. NOTES:-

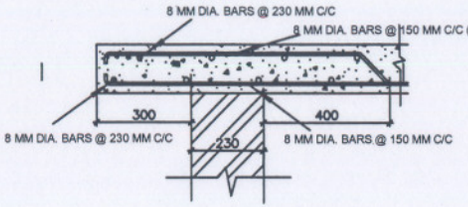
1. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED NEITHER THE BARS SHALL BE COUNTED NOR THE DIMENSIONS SCALED FROM THE DRAWING
2. CEMENT CONCRETE MIX SHALL BE M-20 UNLESS NOTED
3. REINFORCEMENT SHALL CONFORM TO I.S:1786 - LATEST & SHALL HAVE CLEAR CONCRETE COVER (EXCLUSIVE OF PLASTER OR OTHER DECORATIVE FINISHES) AS FOLLOWS:
   a) BEAM = 25 MM, b) SLAB = 20 MM
4. LAP/DEVELOPMENT LENGTH (Ld) FOR MAIN REINFORCEMENT BARS SHALL BE AS FOLLOWS:
   a) FOR CONCRETE MIX M - 20 = 50 D (D=DIA. OF BAR)
5. R.C.C JAMBS TO BE CASTED WITH TOOTHING IN WALLS
6. C.C BLOCKS USED FOR MASONRY TO HAVE MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF 50 kg/sq.cm.
7. BRICKS TO HAVE MIN. CRUSHING STRENGTH OF 50kg/sq.cm

PREPARED & CHECKED BY:-
ANKUSH AGARWAL
Technical Officer, GoI-UNDP
Disaster Risk Management Programme

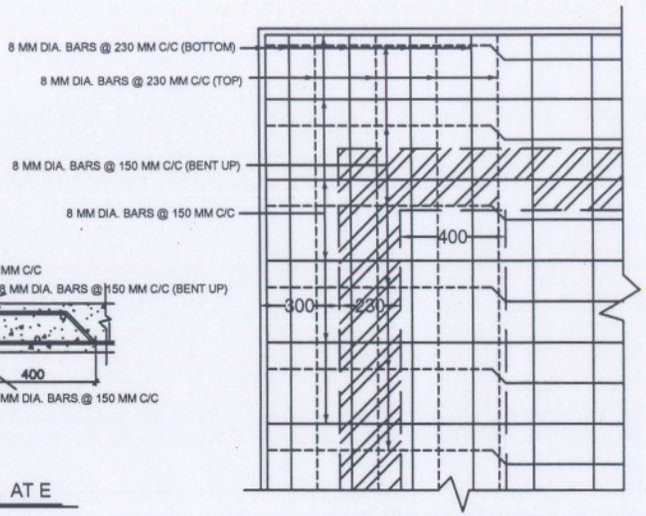
APPROVED BY:-
DR. ANAND S. ARYA
National Seismic Advisor, GoI-UNDP
Disaster Risk Management Programme



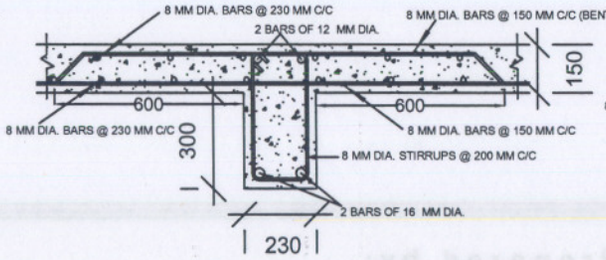
SLAB REINFORCEMENT DETAIL PLAN



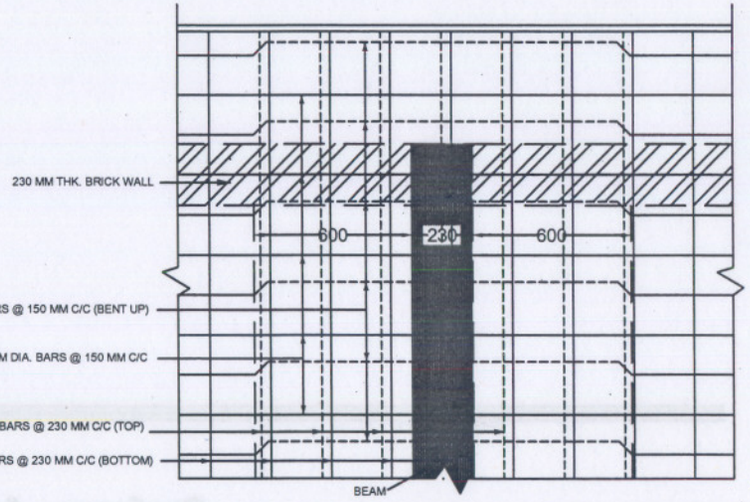
ENLARGED DETAIL AT E



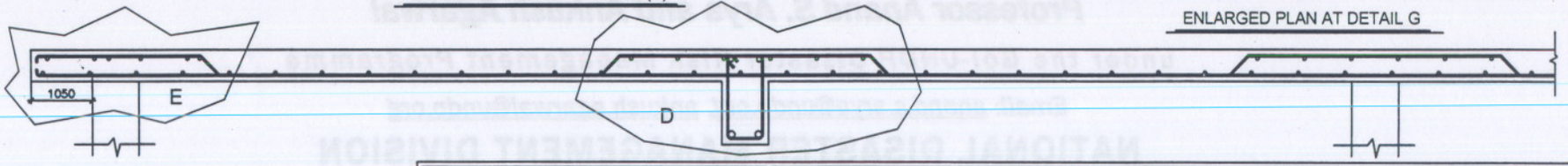
ENLARGED PLAN AT DETAIL F



ENLARGED DETAIL OF BEAM (D)



ENLARGED PLAN AT DETAIL G



PART LONGITUDINAL SECTION OF SLAB

REINFORCEMENT DETAILS

FOUR ROOM SCHOOL BUILDING

SHEET TITLE	DWG. NO.-DRM/SC4/IV-V/4
DETAILS	DATE:- 17TH JULY, 2006

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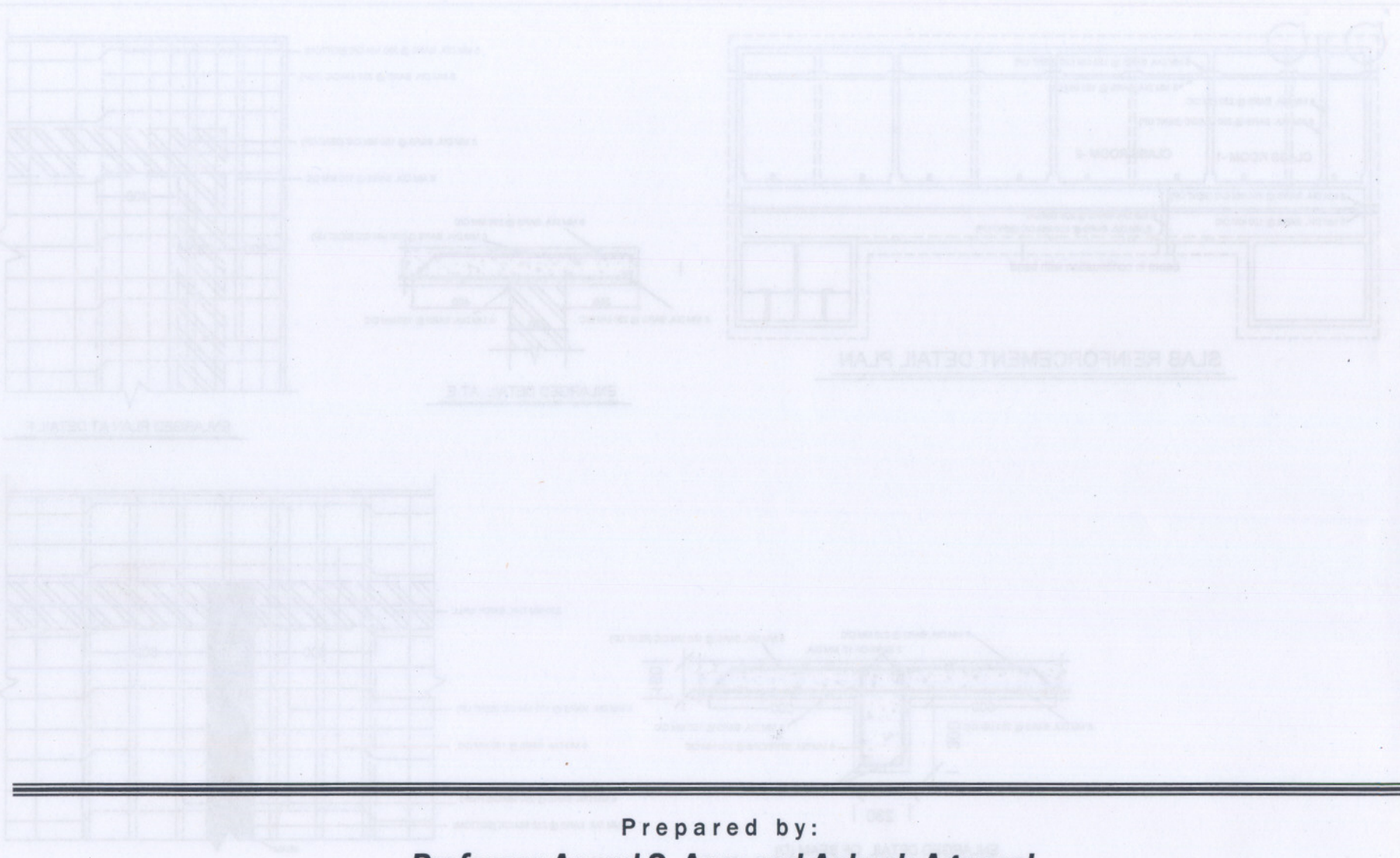

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