From

The Director General, New & Renewable Energy Department Haryana & HAREDA Akshay Urja Bhawan, Sector-17, Panchkula

То

M/s Ecozen Solutions Pvt. Ltd. VIP Rd, Ajuba Park Campus, Near Hotel Grand Neelam, Raipur-492006, Chattisgarh, India.

Memo no. DNRE/Pumps- 16/2021/ 1544 Dated: 13.10.2021

Subject:- Regarding acceptance of alternate MMS design.

In this regard, it is informed that the competent authority has considered the comparison made the BVM Engineering College, Vallabh Vidyanagar, Gujarat for the alternate improved MMS design (10 modules/panels) submitted by your firm vide email and has decided to allow your firm to supply these alternate MMSs design with a condition that your firm shall be solely responsible for these MMSs. It is also informed that the other specifications related to material, galvanisation and other technical features of MMS shall be followed as per MNRE specifications.

(53/10/21

(Sombir Singh) SE-A, for Director General, NRE&HAREDA Haryana, Panchkula

CC:- Programmer, NRE to upload the new MMS design of said firm on website.

ec@zen

To, The Director General New & Renewable Energy Department Haryana & HAREDA Sector 17, Panchkula.

Subject: <u>Submission of new module mounting structure design vetted by 'Birla</u> <u>Vishvakarma Mahavidyalaya</u>, 'Anand-Gujrat' tested for wind velocity of 150 Kmph as per <u>IS 875-1964 for use in above mentioned work vide their letter no.1016 Dt. 10-08-2021.</u>

Ref: 1.) EESL TENDER – EESL/06/2019-20/KUSUM/SWPS/PHASE-1/off Grid/192007012 Dt. 21-08-2019

- 2.) EESL TENDER- EESL/06/2019-20/KUSUM/SWPS/PHASE-1/10HP/off Grid/192012030 Dt. 20.12.2019
- 3.) HAREDA Memo no. DNRE&H/2021/7368, Dt. 07-07-2021.
- 4.) HAREDA Memo no. DNRE&H/2020/7609, Dt. 09-07-2021.

Respected Sir,

With respect to the above subject and references, we are herewith submitting

the improved design of 10MMS for the execution of above work orders along with

certificate from institute and MMS design.

We request you to consider the same and allow us, so that we will proceed further.

Thanking you,

Yours Sincerely For Ecozen Solutions Pvt. Ltd.



Authorized Signatory.

Ecozen Solutions Pvt. Ltd. 301, Vaishnavi Apt., Vijayanand Gruha Nirman Sahkari Sanstha, Narendra Nagar, Nagpur - 440015, Maharashtra, India Correspondence Address: VIP Rd, Ajuba Park Campus, Near Hotel Grand Neelam, Raipur - 492 006 Chattisgarh, India E: contact@ecozensolutions.com www.ecozensolutions.com P: 1800 121 7515





Tuesday, September 22, 2021

To whomsoever it may concern.

Sub: Ecozen Solutions Pvt Ltd. Design Improvement Summary Over MNRE-2019 Specifications

The Ecozen Solutions Pvt Ltd. Drawing / document no. VEF/DA/VDR/003 and 10MMS_72C_VEIPL was reviewed by us and compared with the module mounting structural designs provided in MNRE – 2019 document issued via circular no. F.No. 41/3/2018-SPV-Division. The description of the Ecozen's documents is as follows:

SNo.	MMS Configuration	Content
01	10 Module Mounting Structure	 Report for STADD Pro Analysis as per IS standard Wind Load Calculations as per IS 875 Pile foundation design as per IS std. Structural drawings of MMS

This is to certify that the design and analysis for 10 module mounting structure being offered by Ecozen solution Pvt. Ltd. Is reviewed. The proposed design in structurally adequate and satisfies the requirement of BIS codes. All deflection values are withing permissible limits and design strength of each member is adequate.

It is also certified that the proposed design is an improved design than the MNRE specified design.

Certified by



Prof. V. B. Patel Asst. Prof & Review Officer Prof. Vishalkumar B. Patel Assistant Professor Structural Engg. Department B.V.M. Engineering College, V. V. Nagar-388120

P.O Box No: 20, Vallabh Vidyanagar, Dist. Anand, Gujarat - 388120 Ph. No: (0) (02692) 230104, (P) (02692) 236672

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Birla Vishvakarma Mahavidyalaya BVM Engineering College An Autonomous Institution (Managed by Charutar Vidya Mandal)

ANNEXURE 1

Ecozen Solutions Pvt Ltd. Design Improvement Summary Over MNRE-2019 Specifications

Sno.	Description	MNRE – 2019 Specification	Improved Design			
1	Standard MMS	As per MNRE 2019 Specs - Combination of three standard MMS of 8 Modules for 7.5 HP Such standard MMS will require 3 pole structures of 8 mms which will occupy agriculture land area of Approx. 775 sq ft.	Improved design is a MMS of 10 modules and tested for same stability to withstand at wind velocity of 150 Kmph. The improved design will consume lesser land area of approx. 560 sq ft only.			
2	Provision for Daily Tracking	As per MNRE 2019 specs – "Provision for Daily tracking should be provided by the way of providing min. 8 mm thick metal sheet with precision cut grooves."	10 mm thick metal sheet is used in improved design to provide better strength.			
3	Provision for Seasonal Tilt	As per MNRE 2019 specs - In one structure at least four telescopic supports (three may be used in MMS for 4 modules) either round hollow sections or square hollow section to be provided to support the mounting structure. In such arrangement, the telescopic movement may observe lot of friction due to internal corrosion in longer duration.	The improved design offers slot based seasonal tilt provision for smoother tilting arrangement			
4	Stress and Deflection	Module Mounting Structure to be designed as per IS 875. MNRE does not mention anything about the deflection limits of the structure.	Improved design conforms to the IS 875–1964 using IS 800 & IS 801 standards to withstand a wind velocity of 150 Kmph. Deflection and stresses are within specified limits.			
5	Theft Proofing	J-bolt type bolted foundation is often prone to theft as it can easily be dismantled with a spanner.	Centre mounting column which is heaviest member of the mounting structure has been designed in such a way that centre column is embedded 1000mm inside RCC foundation. Such mounting structures cannot be easily dismantled.			

Certified by



Prof. V. B. Patel Asst. Prof & Review Officer

Prof. Vishalkumar B. Patel Assistant Professor Structural Engg. Department B.V.M. Engineering College, V. V. Nagar-388120

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NO:F172/1016

Tuesday, 10 August 2021

TO WHOMSOEVER IT MAY CONCERN

We have been offered under mentions configurations / designs / drawings of Solar Photovoltaic module mounting structures (MMS) for evaluation as per IS 875-1964.

These designs were evaluated by us using Finite Element Analysis (FEA) for various parameters described in IS 875-1964 at wind load of 150 kms / hour.

Structure size	Drawing Number	Calculated Factor of Safety as per IS 875- 1964			
10 Module MMS	10MMS_72C_VEIPL 10MMS_66C_VEIPL	The elements have been designed using guidelines as per IS 875-1964.The attached report shows that the actual stress in various elements 'Pass' at a wind load of 150 kmph.			

We, therefore, certify that the Solar Photovoltaic module mounting structures (MMS), as per aforementioned design and drawing numbers, fully comply with the requirements of IS 875-1964 and are suitable to withstanding a wind load of 150 kms / hour.

Certified by

Principal BVM Engg. College

Prof. V. B. Patel

Asst. Prof & Review Officer

Dr A. K. Verma

Head, Structural Engg. Dept.



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Birla Vishvakarma Mahavidyalaya BVM Engineering College An Autonomous Institution (Managed by Charutar Vidya Mandal)

10 August 2021

To, Ecozen Solutions Pvt. Ltd. Survey No. 134/1, 134/2 & 130/3 Pune Mumbai Bypass Road Tathawade, Pune Maharastra(411033)

Subject: Evaluation of Module mounting structures

Dear Sir,

You have submitted following drawings for various types / designs of Solar Photovoltaic module mounting structures for evaluation of their suitability for bearing a wind load of 150 Kms/ hour

10MMS_72C_VEIPL 10MMS_66C_VEIPL

These drawings have been evaluated as per IS 875-1964 to withstand a wind load of 150 Kms / hour and we are herewith enclosing the following documents:

- 1. Certificate confirming that the drawings meet the requirements of IS 875-1964 for a wind load of 150 kms / hour.
- 2. Our Analysis of each of these structures.
- 3. Certified copy of each of the aforementioned drawings, including the drawing for the foundation.

Background information of our college.

BIRLA VISHVAKARMA MAHAVIDYALAYA

Engineering Collage, Vallabh Vidyanagar (An autonomous Institution) Managed by Charutar Vidya Mandal



<u>Birla Vishvakarma Mahavidyalaya Engineering College</u> was established in 1948 from donations made by the Birla Education Trust on the behest of Sardar <u>Vallabhbhai Patel</u>, the first Home Minister of independent India. The college

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was inaugurated by Lord Mountbatten, the Governor General of India on 14 June 1948, and rose to prominence under the stewardship of Prof. Junarkar and Prof. K.M. Dholakia. It was one of the first few colleges in India that adopted the progressive credit system of relative grading in India.

Birla Vishvakarma Mahavidyalaya Engineering College (BVM) is a grant-aided engineering institution located in the educational town of Vallabh Vidyanagar, Gujarat, India. It is affiliated to Gujarat Technological University and became an autonomous institution in August 2015, it is one of the oldest engineering colleges in India and the first degree engineering college in the state of Gujarat. Managed by Charutar Vidya Mandal, BVM offers graduate, postgraduate and Doctoral programmes in engineering.

About Us

- A Premier Institute of Charutar Vidya Mandal •
- Founded in 1948
- First Approved by Government as grant-in-aid College
- The college has awarded degrees to over 20,000 graduates
- Degrees offered B.Tech., M.Tech
- The institution offers engineering courses approved by the AICTE, for undergraduate students to doctoral scholars full- and part-time.

Affiliations of the College

UNIVERSITY PERIOD

- Bombay University JUNE 1948 May 1951 .
- Gujarat University JUNE 1951 May 1957 .
- Sardar Vallabhbhai Vidyapeeth JUNE 1957 to JUNE 2008
- (Re-named as Sardar Patel University from 1966)
- Gujarat Technological University JUNE 2008 On wards
- From 2015 onwards it has been granted autonomy. Now it is an Autonomous Institution

Government Recognition

BVM became the grant-in-aid institution of the State Government in 1958 and slowly grants from the State as well as Central Government started trickling in. The Ministry of Works & Housing Government of India, Started a Rural Housing Wing from 1st January 1959. Principal of BVM, was named as the Ex-office Director of the Wing. The wing was later renamed as a Regional Housing Development Centre. The Ministry of Urban Development, Government of India recognized BVM in 1984 as one of the centres for training in-service engineers in Environmental Engineering through postgraduate programmed of M E (Environmental Engineering) (the programmed was run by the institute earlier since 1979..)

Department of Civil Engineering

B.V.M Engineering College is well known since its inception (in 1948) through the stalwarts of Civil Engineering Department like Dr.B.P.Swadas, Prof. V. K. Padmanabhan and Prof. J.H. Patel. Over a period of time, the department has produced eminent engineers, technocrats and educationalists. Today, though we have adopted the changes to move with time, we are holding the spirit and values inculcated into the system. The faculty members of the department are highly qualified and dedicated with an average teaching experience

of 25-28 years. Most of the faculty members trained at various IITs/NITs or National level institutions. We are committed to enrich the knowledge of our students and are fruitfully contributing through the knowledge gained over the years. We always look forward and are adaptable to changes for growth and betterment of our students. The department has well equipped laboratories which are being utilized through aptly designed



experiments, which in turn enables our students to effectively apply the theory learned to practice our performance is reflected through consistent and ever increasing placement of large number of our students as well as consistently commendable university examination results. The departmental activities are aimed at developing employable Civil Engineers with sound technical knowledge and personal traits to cater the needs of various Engineering and Allied Industries. The department is committed to impart quality education apart form guiding of students in extra-curricular activities leading to enhancement of personality, perception, vision and work culture.

Structural Engineering Department

The Department of Structural Engineering was established in 1958 and P. G. in Structural Engineering was established in 1998 with 18 seats.

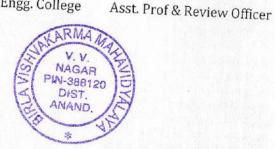
The Department of Structural Engineering is the most efficient department of BVM and offers Ph.D., M.E./ M. Tech and B.E programs. The department has highly qualified, well experienced and dedicated faculty members with an average teaching experience of 20-22 years. The department is equipped with advanced instruments and equipment for research facilities. Experts from leading industries and educational institutes are invited frequently for guest lectures on recent developments for the benefit of student and staff.

The UG programme has got NBA accreditation Till 30/06/2021 vide file no: F20-27/2010-NBA (Vol-II). Dated 17-10-2018.

Project Completed/ Undertaken

Sardar Patel University (Since 2000): Checking & vetting of bldg. str. & Structural audit of existing building Chief Engineering Indian Air Force, Chiloda, Gandhinagar (Since 2010): Checking & vetting of building structure Police Housing Colony, Junagadh (Since 2012): Checking & vetting of firing wall GeoDesign and Research Limited (Since 2012): vetting of design for various building structure & bridges for IAF & IN Indian Navy, Mumbai (Since 2015): Design multi-story building IDMC,V.U.Nagar (Since 2016) : various dairy building in U.P GSRTC, Ahmedabad (Since 2018): Checking & vetting of building structure Kendriya Vidyalaya, V.V.Nagar (Since 2018): Structural health report of 35 year building structure Airport Authority Limited, Calcutta (Since 2019): foundation design & fabrication drawing of tensile fabric structure National High Speed Rail Co-Operation, Ahmedabad (2019): Checking & vetting of building structure Airport Vadodara, Harni (Since 2019): Checking & vetting of various cover for drain for avoiding bird Indian Army, Jabalpur (Since 2019): Checking & vetting of building structure Charutar Arogya Mandal, Karmsad (Since 2019) : Structural health report 20,000sqft hospital structure Western Railway, Vadodara (2020): Design of residence quarter & lift shaft. Rotomag Motors & Controls Pvt. Ltd: VVNagar(2020): Checking & vetting of various MMS Structural System Primier Energy: Hyderabad (2021): Checking & vetting of various MMS Structural System Anand & Vidyanagar Nagar Palika (2021): Checking & vetting of various existing structural system Mangargh Hill Tourism Building (2021): Checking & vetting of various existing structural system

Principal BVM Engg. College



Prof. V. B. Patel

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Dr A. K. Verma

Head, Structural Engg. Dept.

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Structural Engg. Department B.V.M. Engineering College, V. V. Nagar-388120 Prof. Vishalkumar B. Patel Assistant Professor A DATA AND A

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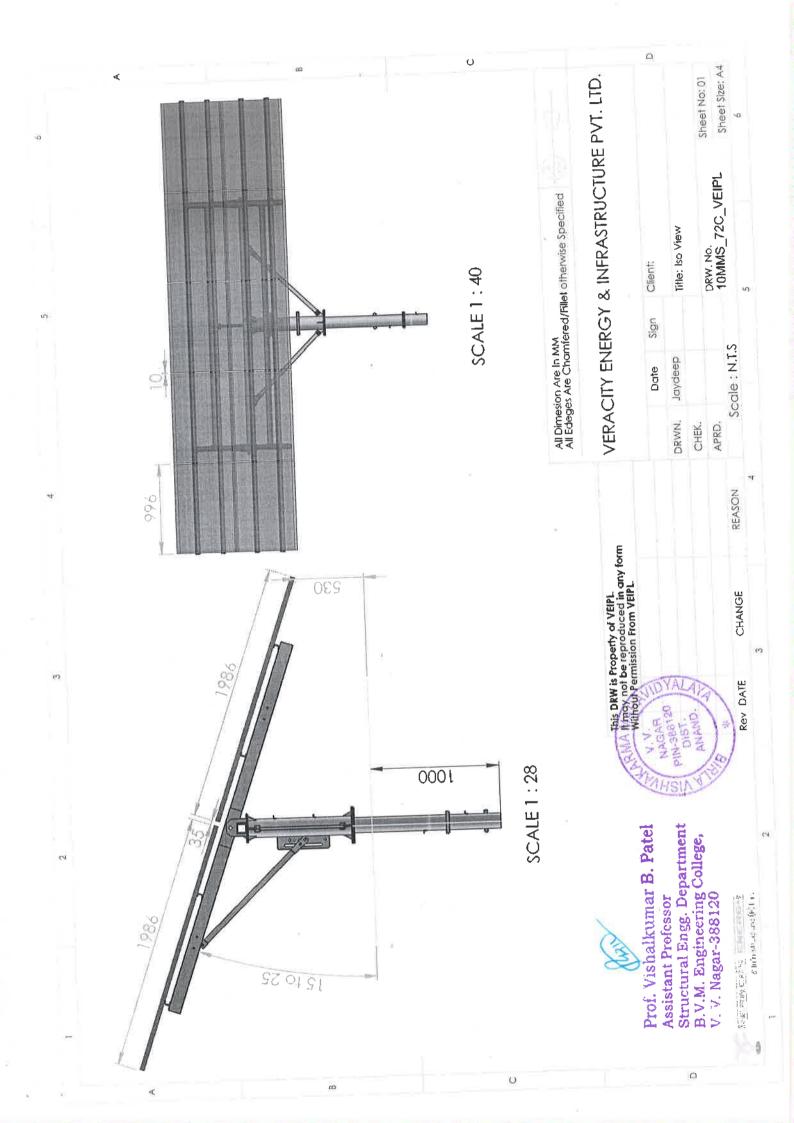
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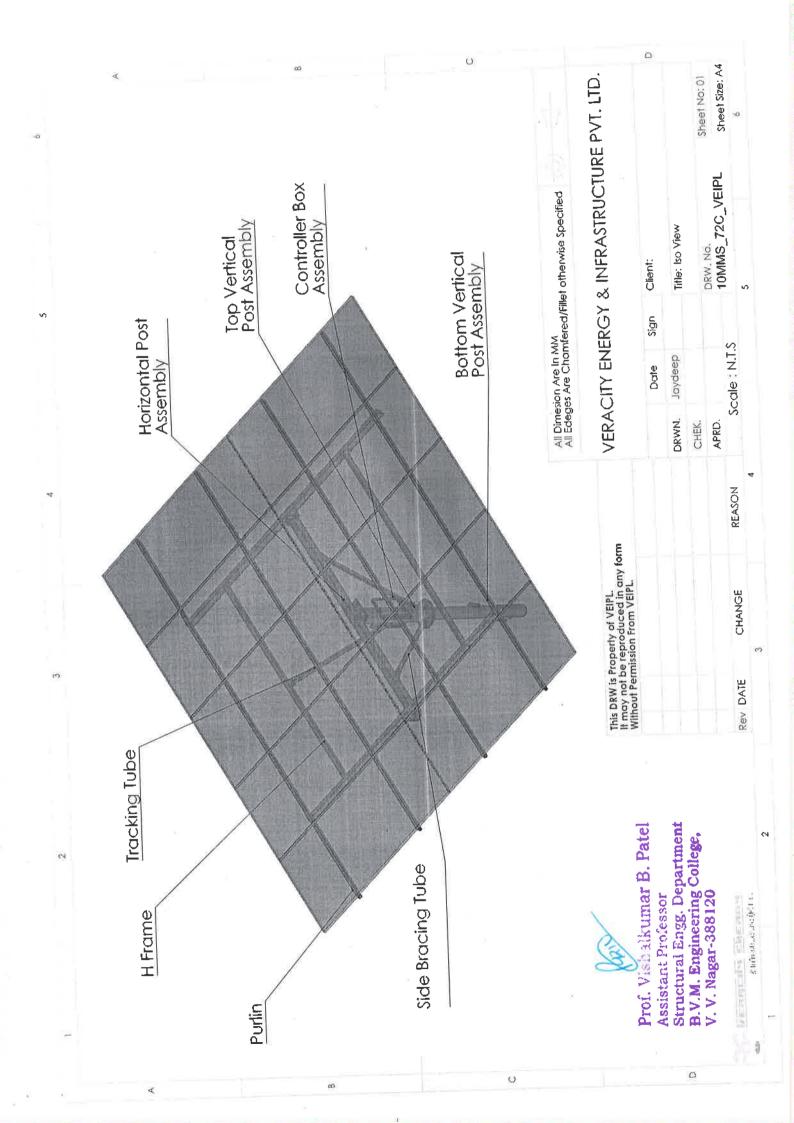
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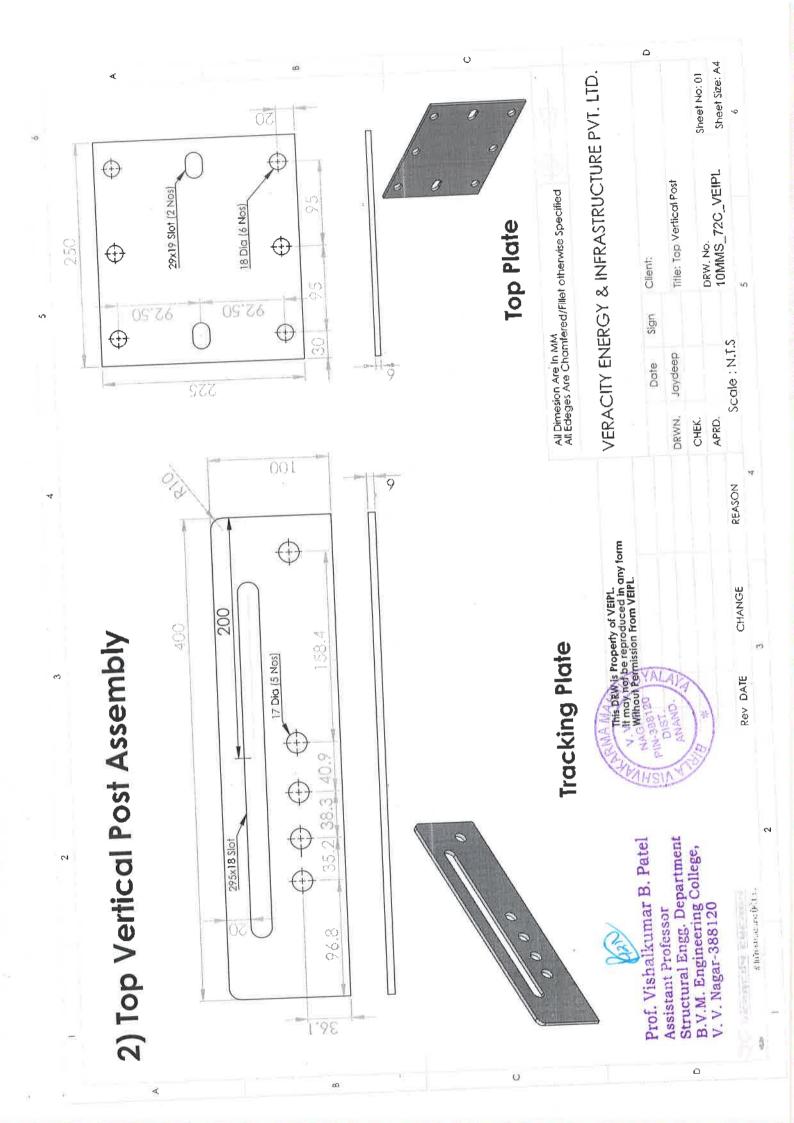
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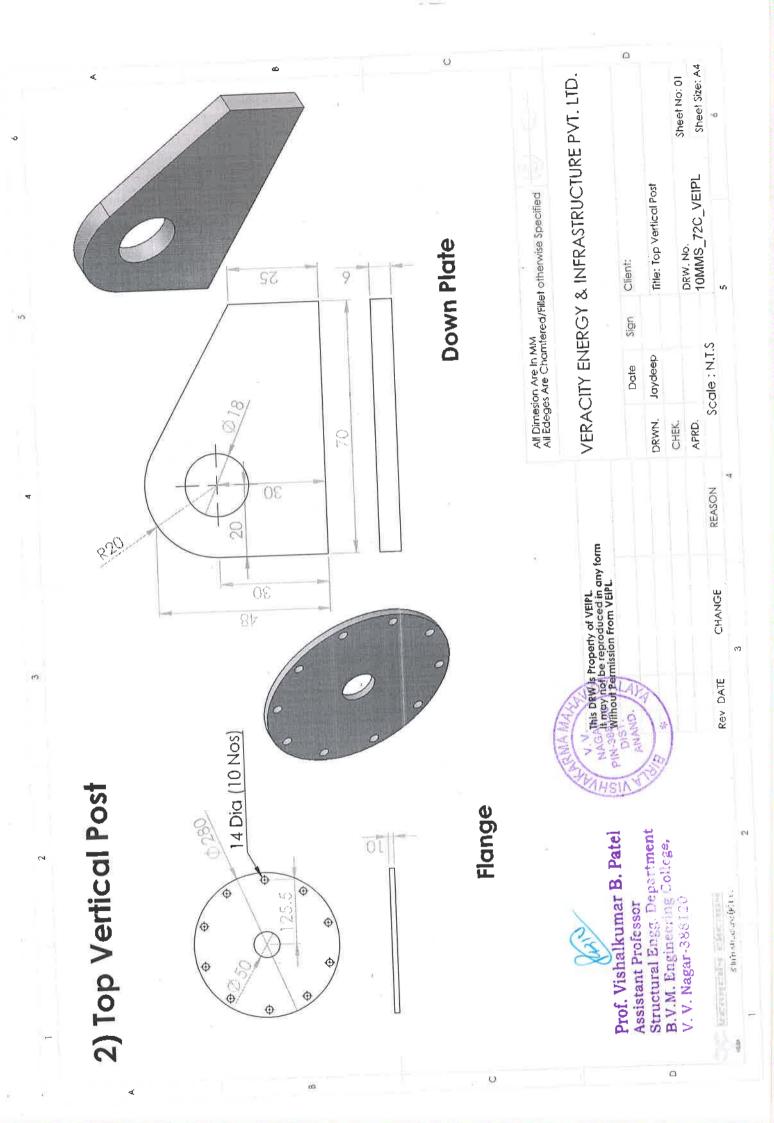




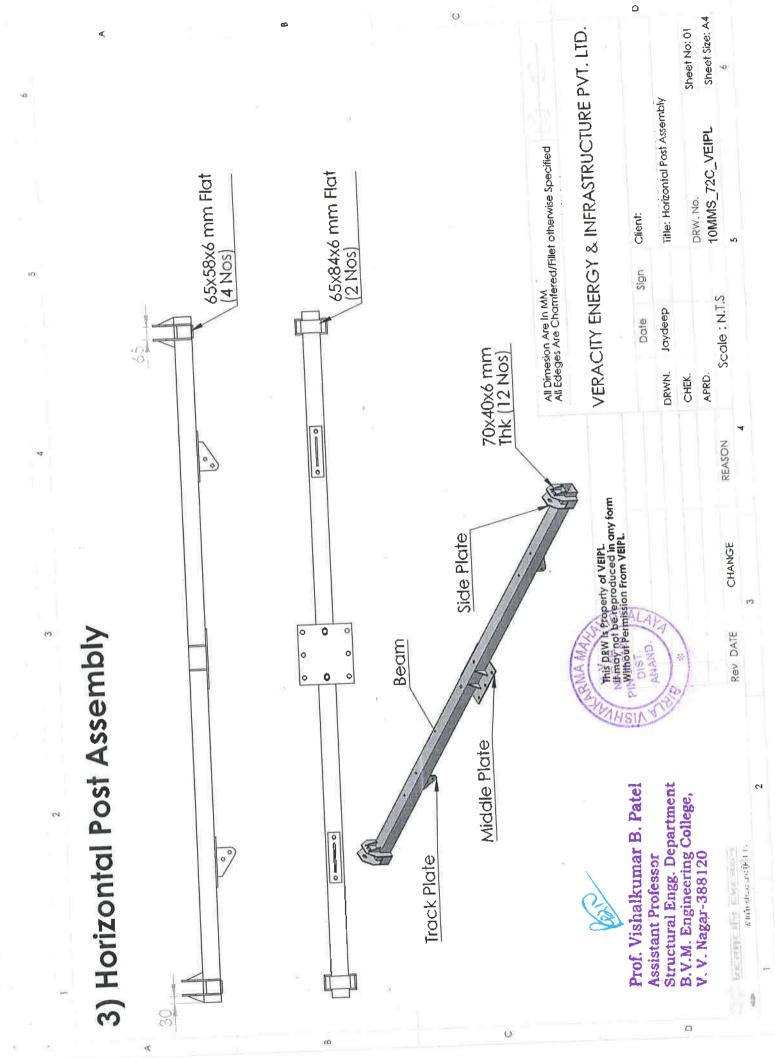






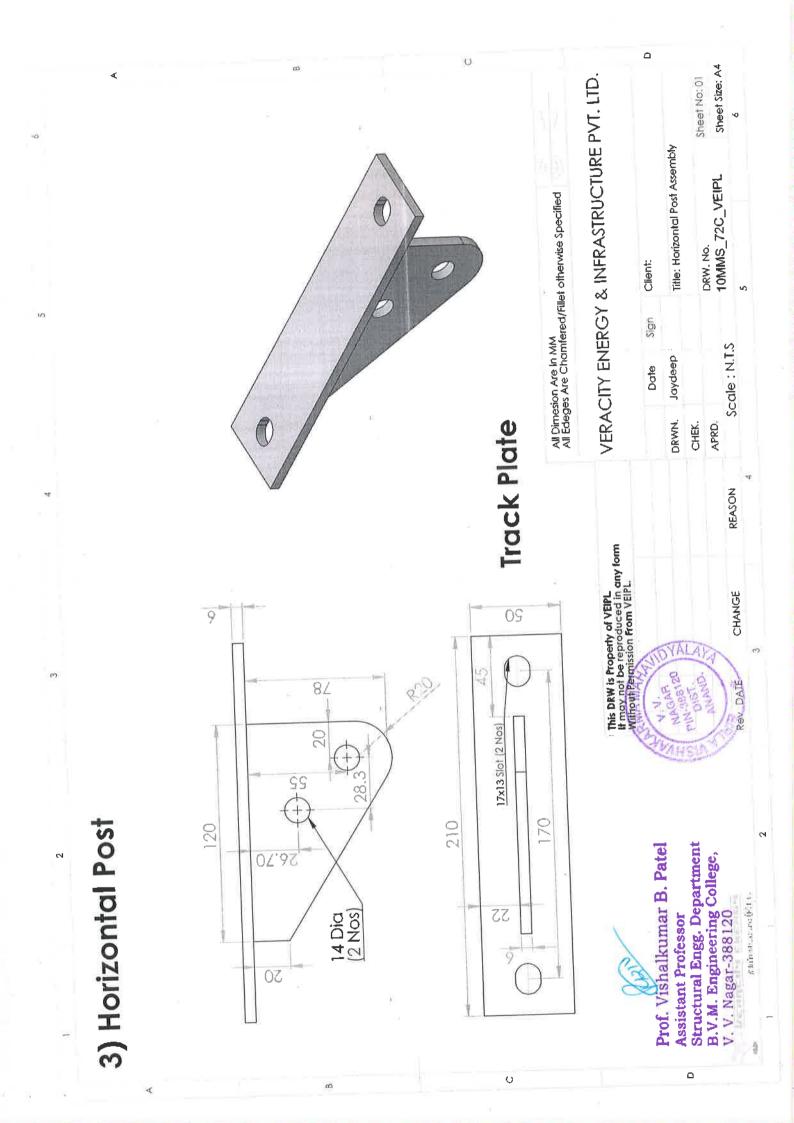


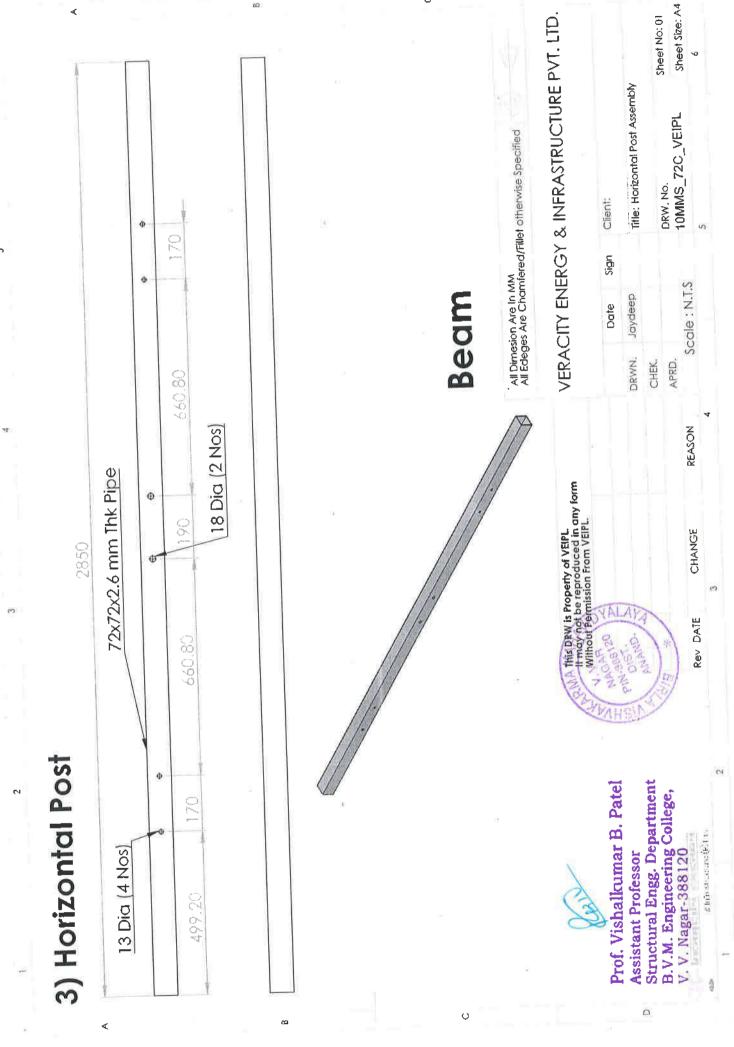






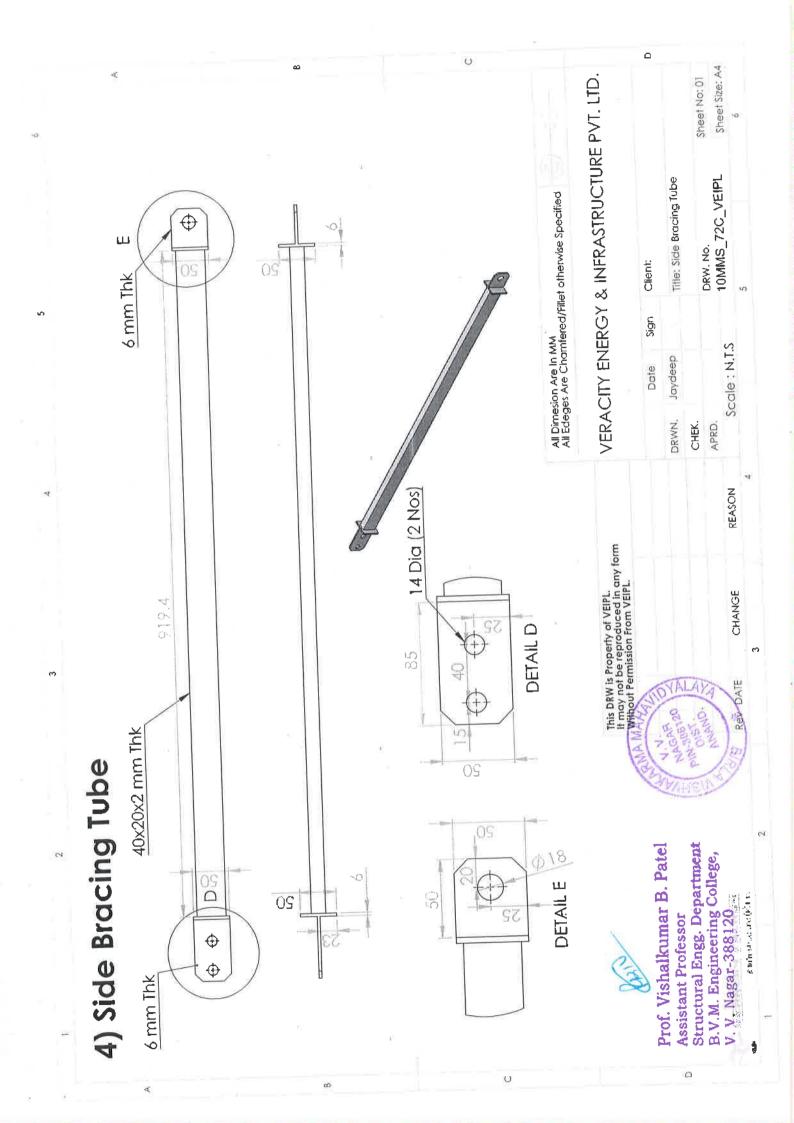


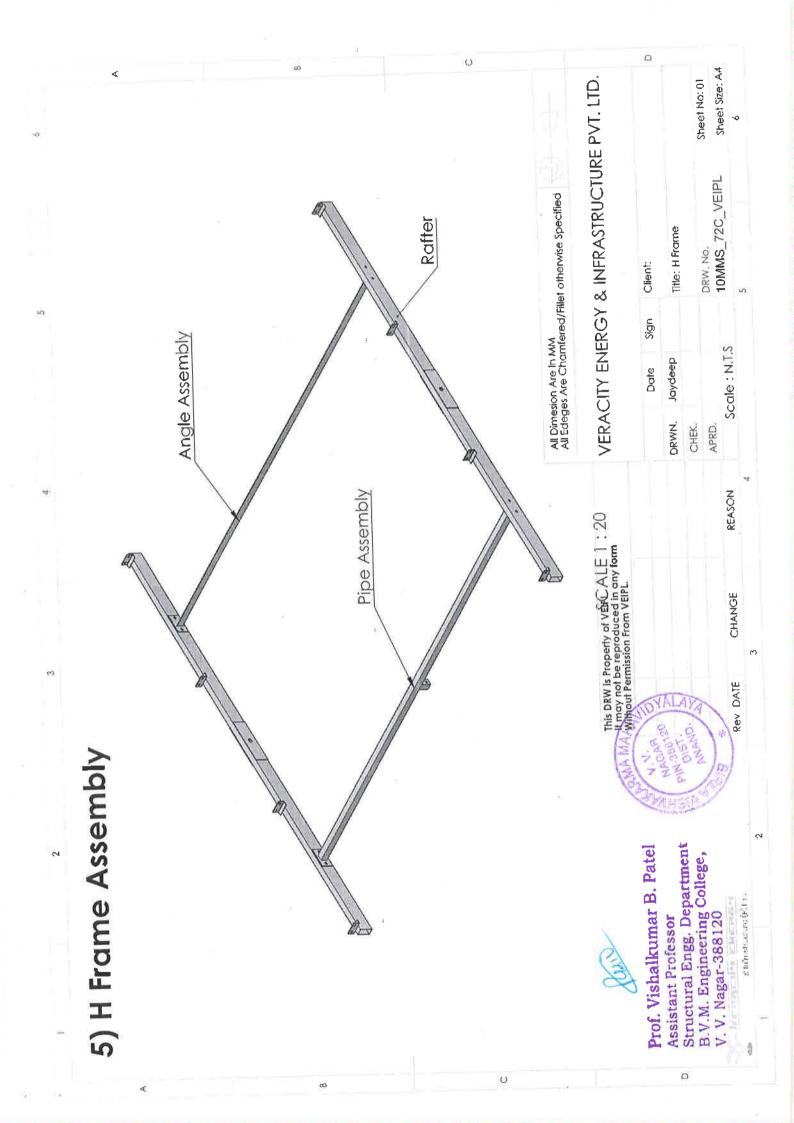


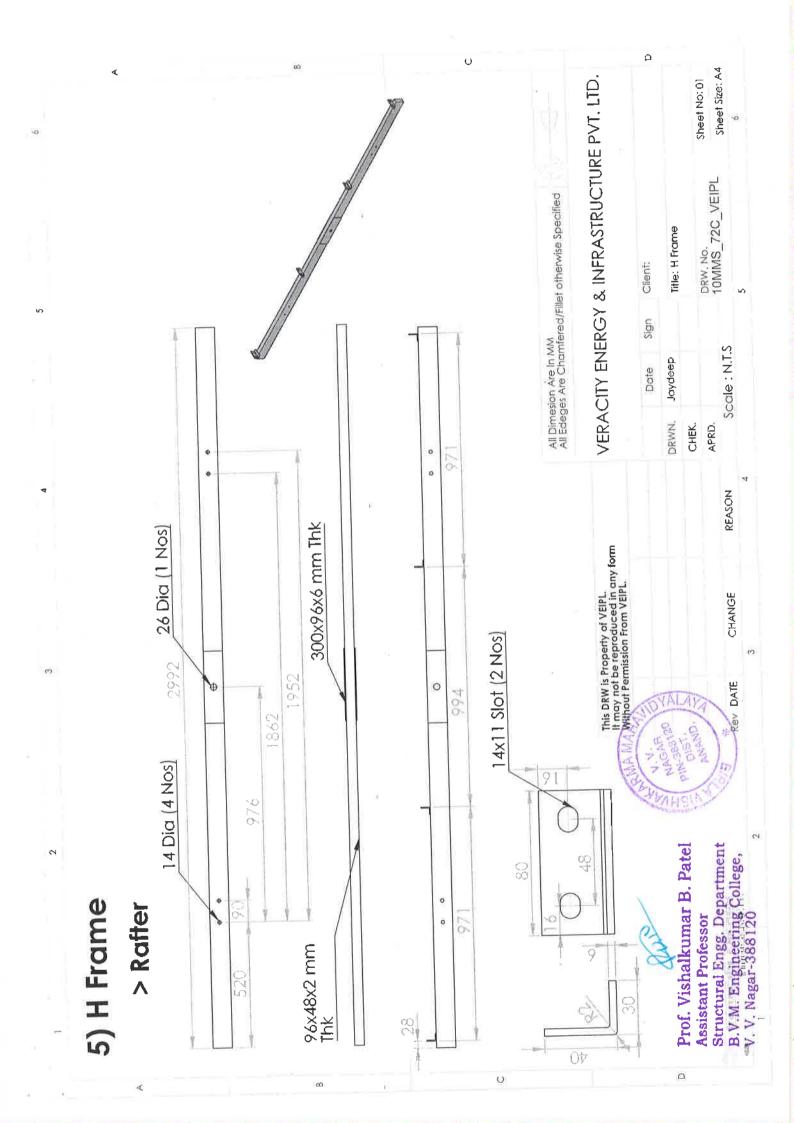


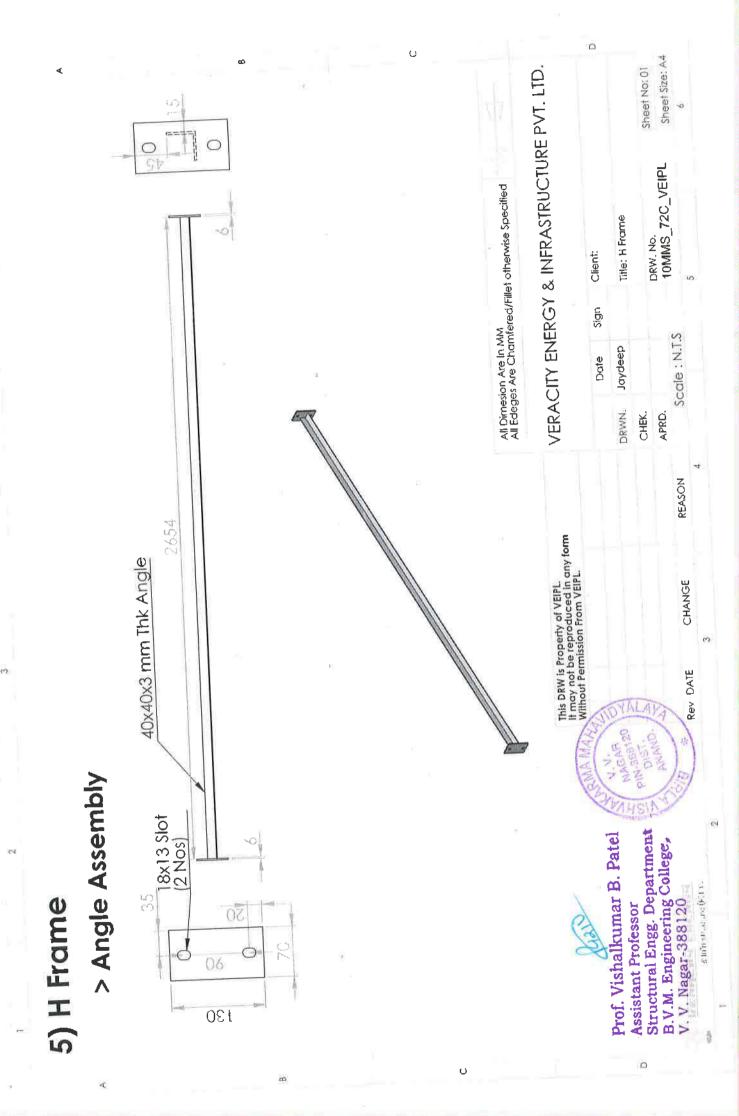
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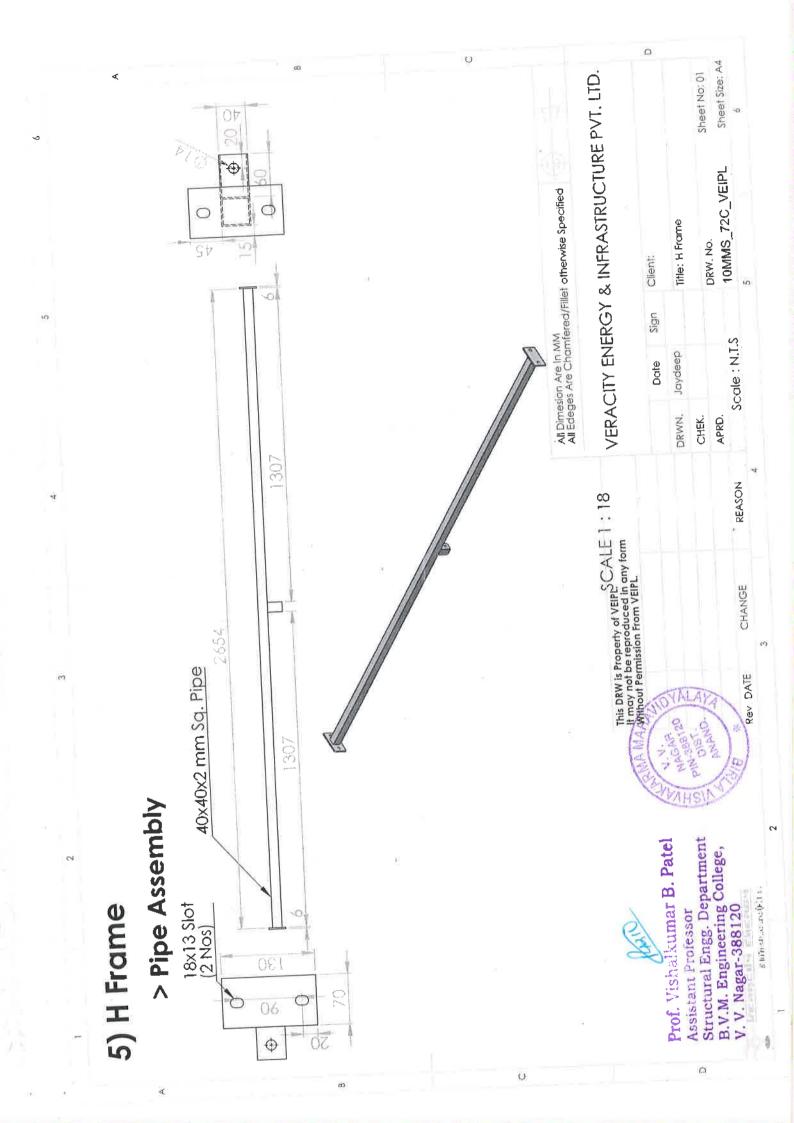
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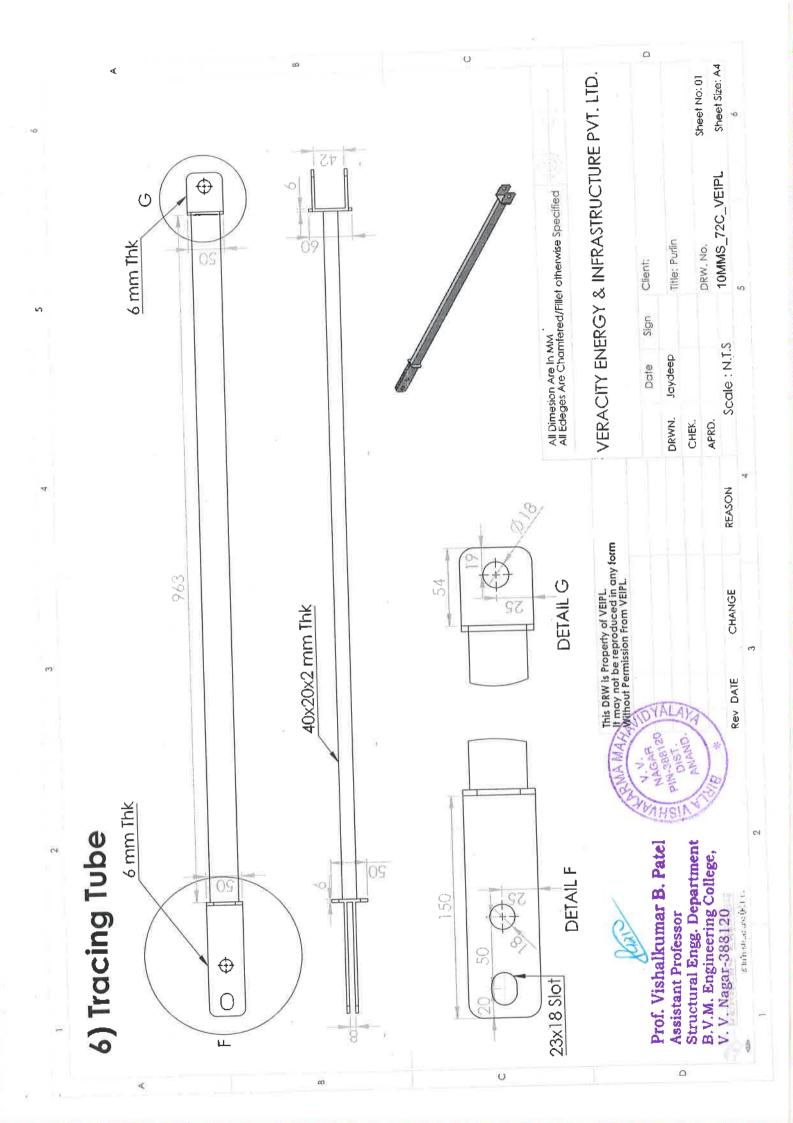


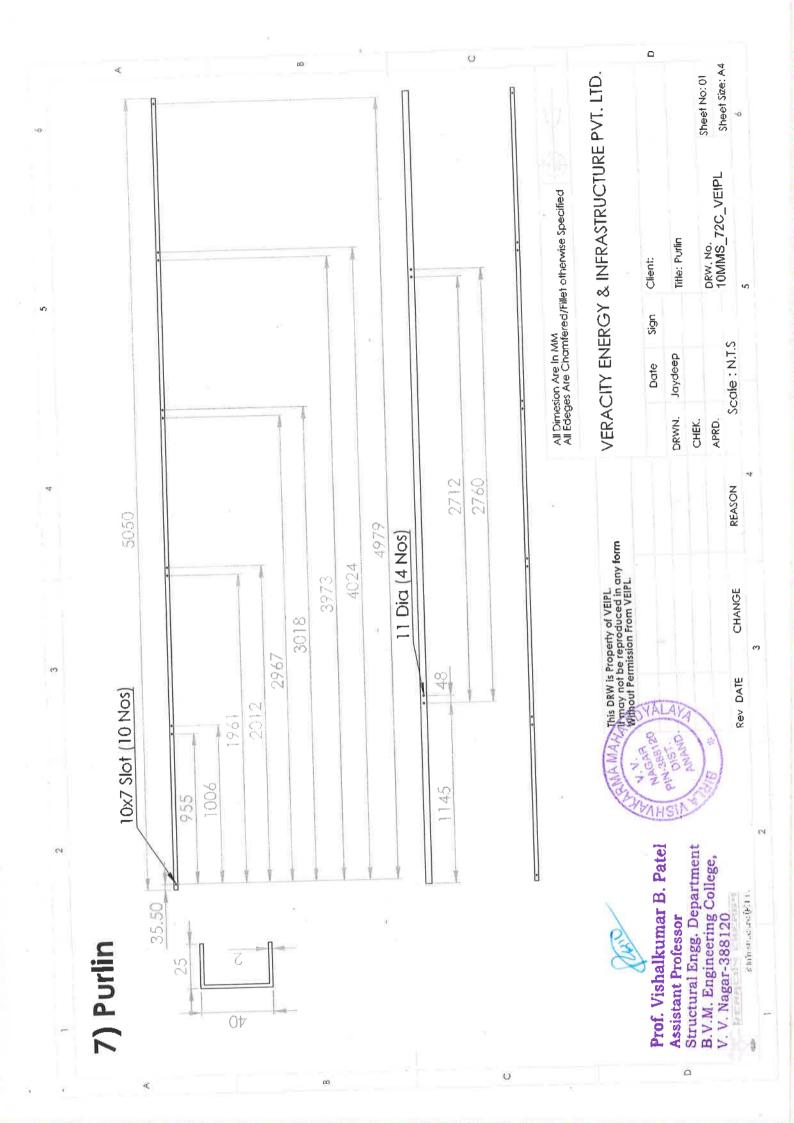


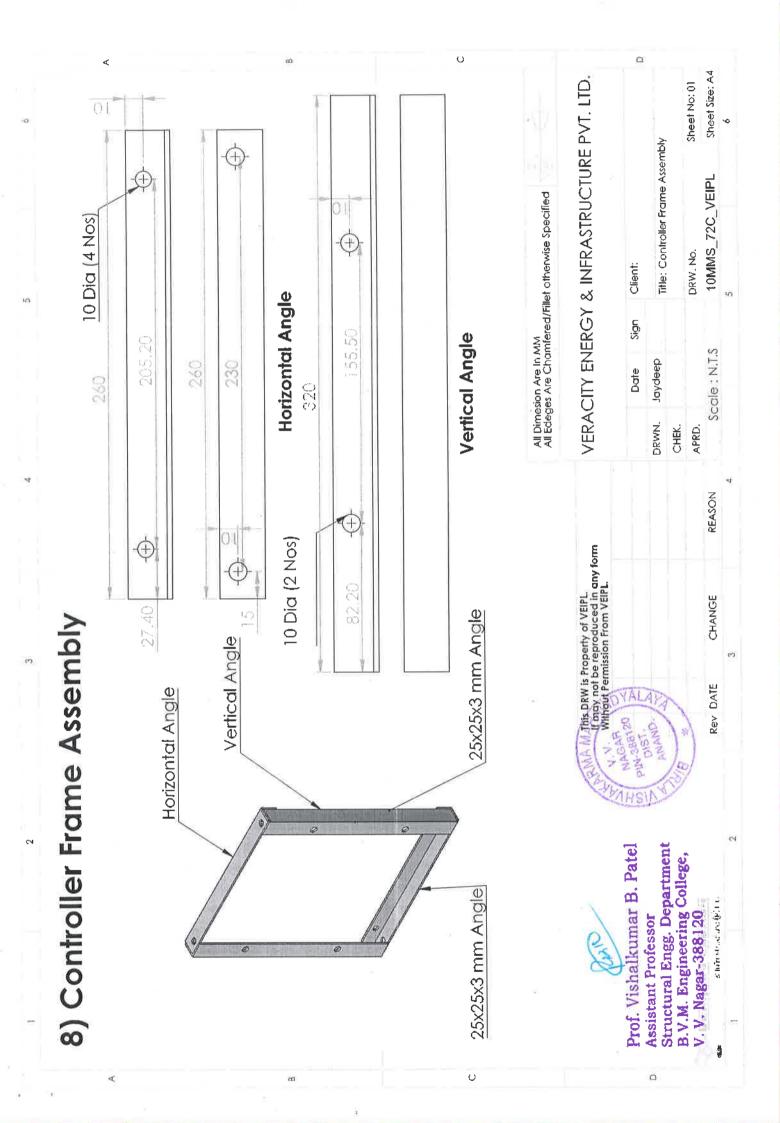












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Structural Engg. Department B.V.M. Engineering College, V. V. Nagar-388120 Prof. Vishalkumar B. Patel Assistant Professor

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