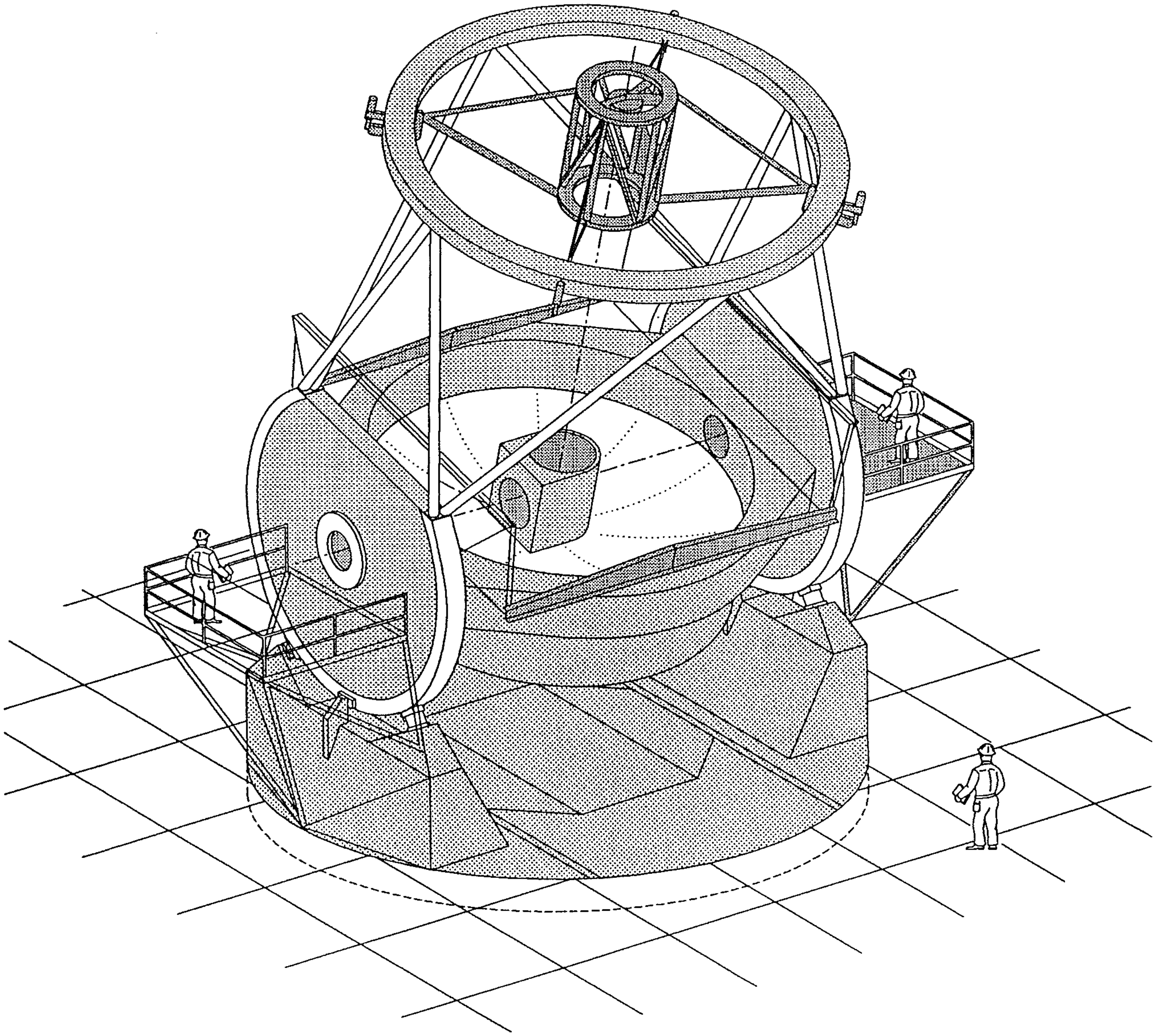
MAGELLAN PROJECT

University of Arizona
Carnegie Institution of Washington



Summary of the Preliminary Design of the Rotating Enclosure

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No. 37

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1.0 INTRODUCTION

The octagonal enclosure concept was developed by the Magellan group in early 1989. Its benefits are low weight due to physical compactness and high structural efficiency and low cost due to the simplicity of its spaceframe and the use of commercially-available preinsulated panels. This concept has been adopted by the WIYN group (Wisconsin, Indiana, Yale, and NOAO) and now exists in hardware for their 3.5 Meter Telescope on Kitt Peak.

Report No. 4 (March 1989) summarized the preliminary design of an octagonal enclosure for the 8 Meter Alt-Az Disk Telescope. It had an inside clearance radius of 42' to the major structure with the rotation bearing (ring beam) under the corners of the octagon. Report No. 11 (May 1989) summarized a modification of the design wherein the ring beam was placed under the flats of the octagon, i.e. "Octagonal Enclosure with Hidden Skirt".

The design has now been scaled to suit the current telescope design summarized in Report No. 36. It has an inside clearance radius of 34' to the major structure. The design is shown on drawings E271068 sheets 1 through 8 and summarized herein. Included is the complete rotating enclosure assembly including structure, preinsulated panels, air vents, bi-parting shutters and shutter drives, and enclosure rotation trucks and drives. The preliminary design of the stationary building is not defined here, but is assumed to be a 16-sided spaceframe with each of the eight truck assemblies mounted on alternate columns.

Unless otherwise stated, sheet numbers in this report will be references to drawing E271068.

2.0 STRUCTURAL DESIGN

2.1 SYSTEM DESCRIPTION:

The rotating enclosure for the Magellan 6.5 Meter Telescope approximates a hemispherical dome with a 17-panel spaceframe. The geometry is shown on E271068 sheet 1 and can be seen as a multiply-truncated right octagonal cylinder.

2.10 Telescope/enclosure system clearance:

The minimum inside clearance radius from the center of the enclosure to its main structural members is 34' - 0". With a maximum clearance radius of 30' - 6" to the end of the telescope, this provides a minimum of 42" of radial clearance between the end of the telescope and the enclosure structure. Note that this (34' inside radius) applies not only to the 17 flat panels, but also the ring beam and reinforcing brace at the edges of the slit.

However, two non-structural features encroach on the 42" radial clearance to the telescope. The more significant of these is the secondary mirror handling platform, shown on sheet 8. It attaches to the stationary building with a ladder for access from the observing floor. Due to the reduced radius defined by the stationary building structure and the 30" wide platform itself, there will exist only a few inches of clearance between the telescope and the platform when the f11 secondary mirror is installed on the telescope. Therefore, the control system will include an interlock such that the telescope can only be positioned near that area when necessary for a secondary mirror change.

The second feature which encroaches on the 42" clearance is the jib crane. As shown on sheet 7, the telescope comes to within about 26" of the stored jib crane at its closest approach. Therefore, under normal operation (that is, at all times other than during the changing of the secondary mirror) 42" clearance will exist between the end of the telescope and the enclosure system except for this local 26" clearance area near the jib crane. The system will be interlocked so that the telescope can't be operated unless the jib is in its fully stored position.

A third interlock which might be desirable would be one in which the enclosure rotation can only be controlled from the jib crane pendant when the jib crane is in use, and only if the telescope is at horizon.

2.11 Structural member sizes:

Finite element analysis was performed on the earlier (8 Meter) design, but has not been performed for the preliminary design shown herein. Structural members were scaled (somewhat conservatively) from those of the 8 Meter design shown in Reports 4 and 11.

For example, the predominant structural member size at the 8 Meter scale was 12 x 12 x 1/4" square tubing. This would theoretically scale to 9.5 x 9.5 x .20" square tubing under the same 46 psf wind loading. The next larger size readily available is 10 x 10 x 1/4", so this was used in the drawings and weight estimate. We can probably expect in the detail design that many members can be made smaller; for example 8 x 8 x 1/4" or 3/16" square tubing. Therefore, the weight estimate included on sheet 1 should be slightly conservative in terms of the items included therein.

However, some items have not been included which will add to the system weight. For example, the vent doors and their framing have not been shown on the drawings nor included in the weights, since the type and sizes have not yet been finalized. The weight estimate was done with the preinsulated panels and girts being continuous, as if no vents were to be used. The net effect will likely be a small additional weight which may offset the excess structural weight discussed above.

2.12 Preinsulated panels:

Two general types of preinsulated panels have been considered; foam filled honeycomb-core panels with metal skins, and preinsulated panels with metal skins and a foam core. A study of commercially available panels is currently in process.

2.2 CONSTRUCTION METHOD:

Various combinations of shop preassembly and field construction are possible with such a structure. One extreme would be to design and manufacture fully welded joints (no structural bolting) and fit and weld the structure entirely in Chile. This method is described in considerable detail in Report No. 4. The advantages of this method are less expensive joints and the elimination of an additional assembly/disassembly step at the manufacturer's facility. A potential disadvantage is that engineering and manufacturing errors are discovered in the field where they can be more costly to fix.

Another extreme would be to detail and manufacture every structural joint as a bolted assembly and preassemble and test the entire system at the manufacturer's facility. Then the system would have to be disassembled, shipped to Chile and then reassembled. The disadvantage to this method is the high cost of the bolted joints and (possible) additional assembly and disassembly steps.

An intermediate approach would be to use an inexpensive temporary bolted joint for preassembly at the manufacturer's facility. Such a joint is shown in the "Typical Connection" view on sheet 2. This design would allow preassembly of the spaceframe (not girts and preinsulated panels) without the expense of the fully-bolted joints. The joint would subsequently be fully welded on-site. Some joints, where fixity is critical to the structural integrity of even a temporary assembly, would be more significant than shown. It should be noted that this general approach was used with reasonable success on the WIYN enclosure. The temporary joints were a little less precise than that shown as the typical connection on sheet 2.

This intermediate method has been chosen for the Magellan Project. The entire spaceframe and all mechanical systems (except vents) will be preassembled and tested at the manufacturer's facility. Temporary bolted joints can be used at this stage with much field welding, at the manufacturer's option. The girts will not be preassembled except that one facet of the enclosure will have girts, preinsulated panels, typical flashing, and vent door installed. This will be done to verify feasibility of doing the same in the field.

3.0 MECHANICAL DESIGN

3.1 BI-PARTING SHUTTERS:

The shutters are shown on sheet 2. They consist of a three-faceted frame of rectangular tubular sections with diagonal braces. The frame is covered by girts and preinsulated panels in a manner similar to that of the enclosure structure. As shown in Views C and D the lower and upper ends of each shutter are supported by wheels which run on tracks on support beams of the enclosure structure. They are guided laterally by 4" track rollers and restrained vertically by uplift clips (or alternatively, uplift rollers).

The drive mechanism indicated is a chain-and-sprocket design with all wheels driven. The two wheels at either end of the shutter are synchronized by the chain drive, but the upper and lower sets are not synchronized with each other by the drive. The track roller guidance system and inherent stiffness of the structure will provide adequate synchronization of the two ends of each shutter. An obvious alternate drive design would be rack and pinion, with the rack mounted on the shutter and pinion drive on the enclosure. This would have the advantage of the drive motor being hard-wired (it would not travel with the shutter).

Each end and the outboard edge of the shutter are sealed to the structure by an elastomeric seal (rubber tube) as shown on sheet 2 of the drawing. The two shutters are sealed to each other along the parting interface when closed and to the structure when open by similar seals.

3.2 ROTATING/STATIONARY BUILDING INTERFACE:

3.21 Trucks:

Eight truck assemblies are mounted on top of the stationary building. They are shown in Section B-B (sheet 3) and projected views. Each truck assembly consists of a two-wheel bogie mounted to the structure through a flex plate and Fabreeka pad spring assembly. The flex plate serves to define the assembly horizontally and support a portion of the wheel vertical loading while allowing some articulation of the assembly to effect even wheel loading. The Fabreeka pads react the bulk of the vertical load. They have good damping and spring properties and should make for a quiet-running assembly.

Although not shown, two of the truck assemblies will be drive units. A hollow shaft speed reducer, DC motor driven, will be mounted on each of the two drive units.

Each truck assembly has five degrees of freedom of adjustment using the end supports as shown. These will be used to adjust each assembly's radial and vertical position as well as all three angular attitudes (rotation about the vertical and two horizontal axes). The two angular attitudes critical to proper tracking can be determined using a theodolite mounted at the center of rotation of the enclosure reflecting off a precision mirror mounted on the inboard end of each axle. The center of rotation will be defined by the geometric center of the 16 radial guide rollers.

With the trucks precisely adjusted as described, scrubbing between the wheels and rail will be negligible. This will assure that the system is quiet-running with very long wheel and rail life.

3.22 Azimuth position encoder:

One ordinary rotary encoder will be provided on one of the truck wheels. Two (non-contacting) microswitches will be provided, one to reference to one absolute azimuth position, the second to reference to (36) absolute positions (every 10° azimuth position).

3.23 Radial rollers:

The radial roller assembly shown serves to position the enclosure with respect to the stationary building. This assures proper tracking of the rail with respect to the truck wheels and maintains alignment of the enclosure rotation seal. Although the weight of the enclosure should be adequate to preclude uplift even in the design 150 mph wind, it also provides uplift protection at its top end as shown. (The rolled steel angle is welded continuously to the inside diameter of the ring beam). The 1/4" x 5" cold rolled steel wear strip provides a locally harder surface than that of the ring beam and allows the running surface to be replaced if necessary.

3.24 Building rotation seal:

One possible concept for the building rotation seal is shown on sheet 3. The seal shown could be rubberized canvas (as has been used commonly in the past), or an elastomeric material such as silicone rubber. Silicone rubber would have the advantage of a more positive seal (it could be installed with a slight radial preload resulting from circumferential stretching).

3.25 Slip rings:

As shown on sheet 3, 5 Duct-O-Bar ("Figure 8") slip rings will be used:

(3) for 3-phase power.
(1) for a separate dedicated ground.
(1) for 110 VAC (to be verified).

Control circuitry will be conveyed to the rotating enclosure via multiplexing either through the above slip rings or by radio transmission.

3.3 f11 SECONDARY REMOVAL:

It will likely be necessary to remove the f11 Gregorian secondary when changing to the far infrared optical configuration. For this reason a fixed platform containing a removal mechanism will be mounted near the top of the stationary building as shown on sheet 8. Access is via the ladder from the observing floor. Although not normally required on a ladder of this length, a cage has been included as shown. This was done as an added safety feature in the event personnel should forget to connect the chain at the end of this relatively small platform.

The secondary support carriage will be capable of being rolled out to a position under the secondary when on the telescope, or back to the stored position as shown. As discussed earlier, only a few inches of clearance will exist between the telescope and the platform, so the system will be interlocked against travel to this position except during a secondary change.

3.4 AIR VENTS:

Fast thermal response of the telescope and enclosure structures to night-time air temperature changes is highly desirable for good seeing. Controllable air vents will be placed in the rotating enclosure and stationary building for this purpose. It is expected that the vents will be wide open under very low wind conditions but choked down considerably in high winds. Roll-up "garage" doors or horizontal bi-fold hangar type doors are two types being considered.

One possible arrangement of size and locations for the vents is shown on sheet 4. The final sizes and types for the vents is yet to be determined, pending consideration of ventilation effectiveness, first cost, maintenance and other issues.

3.5 WINDSCREEN/MOONROOF:

Under high frontal wind conditions a windscreen will be desirable to minimize wind forces on the telescope. In addition, with such a relatively wide slit in this compact enclosure, stray light (such as moonlight) on the primary must be minimized. Therefore, a two-part moving screen which generally tracks the primary light beam is desirable and is shown on sheets 5 and 6.

The concept chosen for both screens is similar to that used for the Siding Spring 2.3 Meter Telescope in Australia.

The back side of the system (the "moonroof") serves predominantly to block stray light. It consists of a series of rigid aluminum-honeycomb panels hinged with respect to each other and guided by track rollers at their ends. As shown, this assembly will store along the back edge of the slit. At its furthest-forward position it will block stray light from above with the OSS as far as about 45° from zenith.

The relatively thin panels connected structurally along their hinge lines define a much higher stiffness and strength (than for just the thin panels) due to the corrugated shape when deployed. The corrugated shape defined by the dual track system therefore provides high strength and reliable collapsing to the stored position. A 1/10th scale model has been constructed which demonstrates proper collapsing and deployment for both the moonroof and windscreen.

The front portion of this system (the "windscreen") serves to block light and wind. This system has considerable commonality with the moonroof. The panels are identical except that they may include holes to provide some ventilation. Relatively minor differences exist in the track systems and drives.

A continuous-loop roller chain drive is planned for both moving assemblies, as shown on the drawings. A preliminary design for an alternate rack-and-pinion drive was also developed. The roller chain drive was chosen for its simplicity, robustness, and lighter weight.

One ordinary rotary encoder will be mounted on one idler sprocket in each windscreen assembly (or alternatively on the drive motor).

3.6 EQUIPMENT LIFT:

An equipment lift, though not presently shown on the drawings, will be incorporated in the design. The purpose of the lift will be to move equipment vertically between the finished slab, observing floor, and Nasmyth platform levels. The moving platform will be approximately 6 to 8 feet wide, 10 feet long, and have a capacity of 6,000 lbs.

Two concepts are currently being considered. One would meet the requirements of the ANSI B20 Code for Vertical Reciprocating Conveyors. It would be used for equipment only (personnel could not be on the lift when it was moving) and would pose some operational inconvenience.

The second would be custom designed to be operationally more convenient but would (likely) not meet the requirements of any specific code.

Work on the equipment lift remains in process at this time.

3.7 ROTATION LOCK:

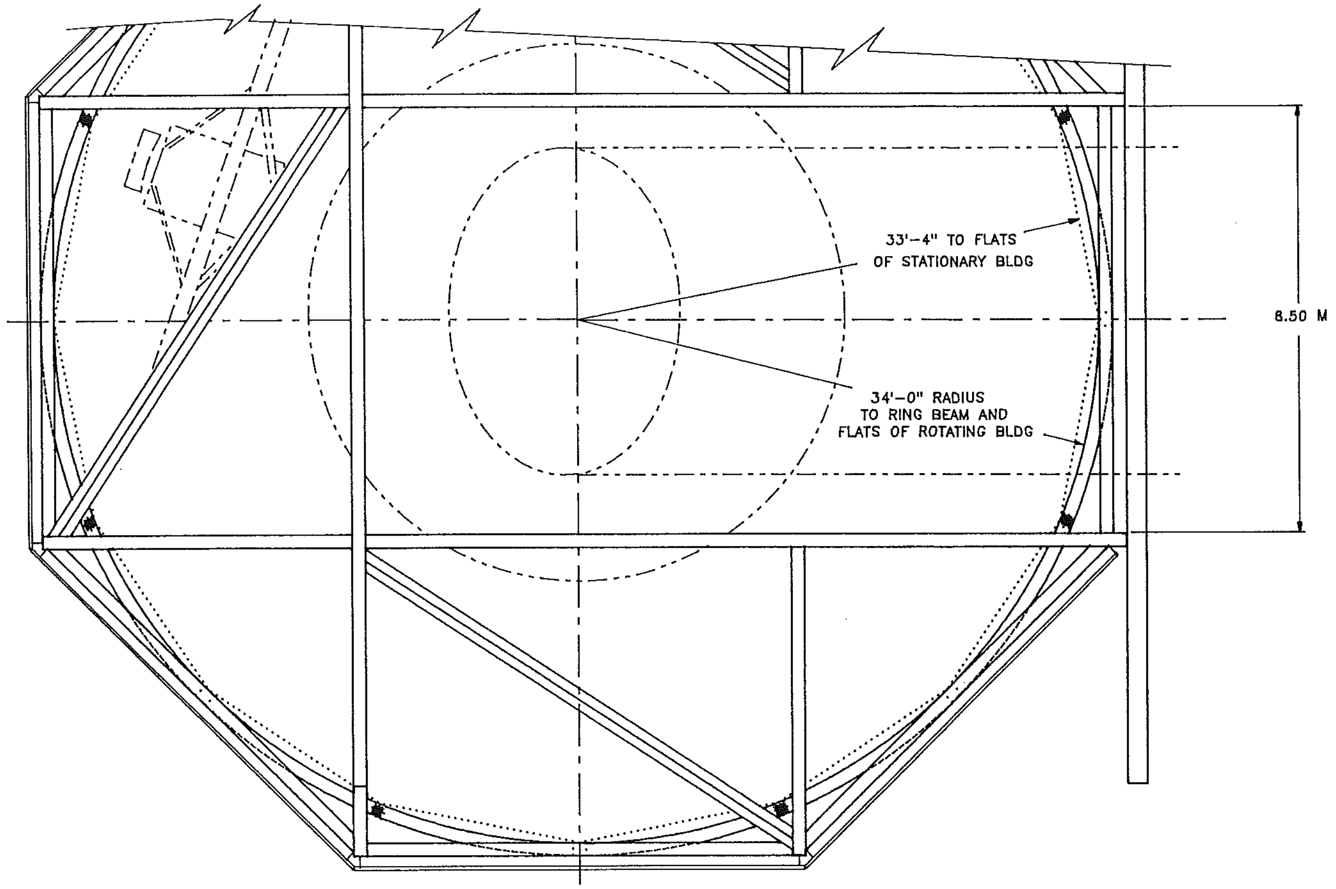
Although not indicated on the drawings a locking device, which will prevent enclosure rotation due to high winds, will be provided. It will be remotely operated with adequate capacity and alignment means to work reliably. It will allow the locking of the enclosure in either of four (90° azimuth) positions.

4.0 ACKNOWLEDGEMENTS

The Magellan enclosure preliminary design resulted from a long-term collaboration by many persons at The Observatories of the Carnegie Institution of Washington (Pasadena, Ca.) and L & F Industries (Huntington Park, Ca.).

Thanks are also extended to Matt Johns (WIYN Project) for his advice and John Hart (Mount Stromlo and Siding Springs Observatories) for providing information on their windscreen.

LTR	DESCRIPTION OF CHANGE	APPROVED
A	INCREASED SIZE, UPDATED WEIGHTS, ETC. SMG 3-28-93	

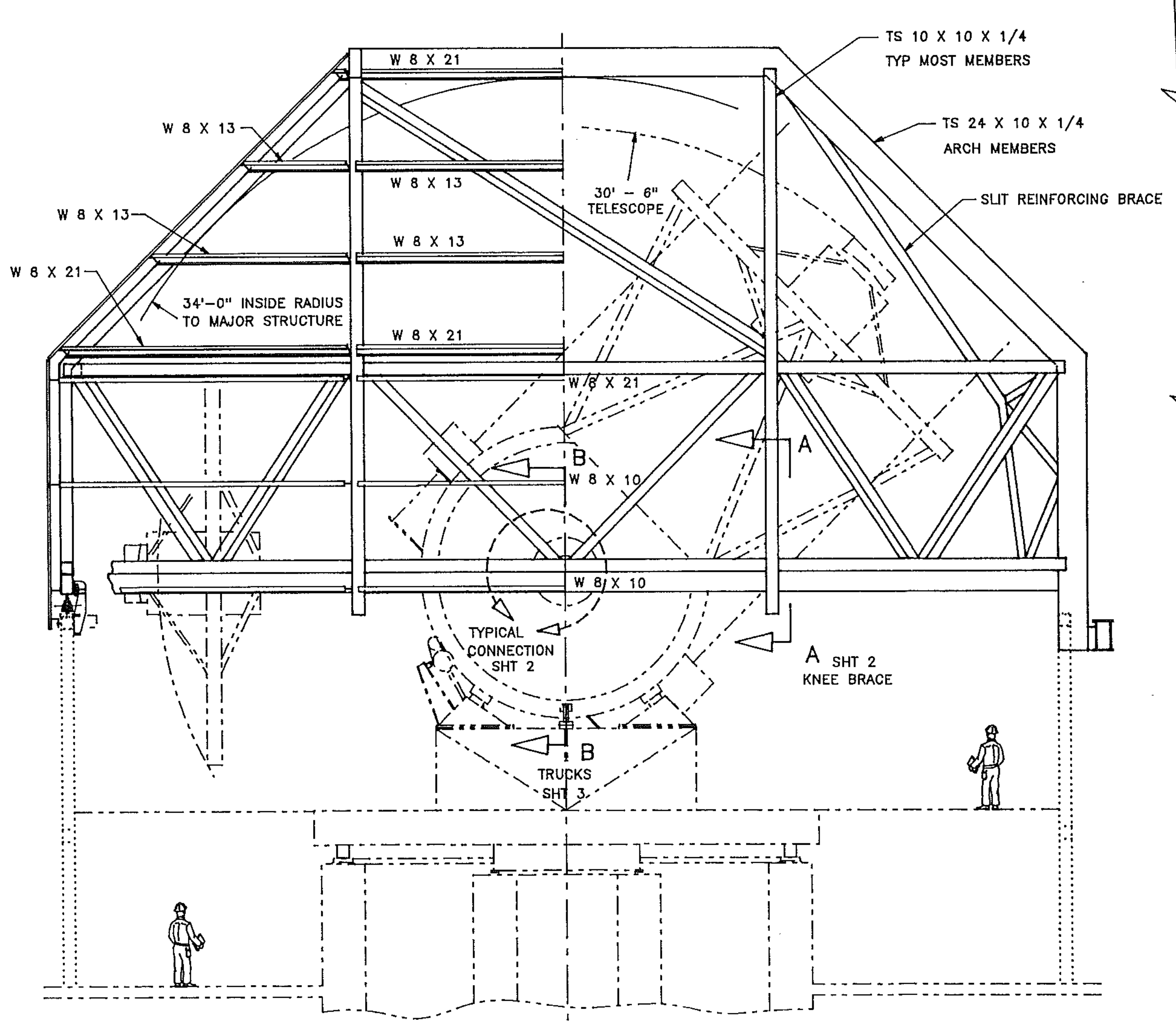


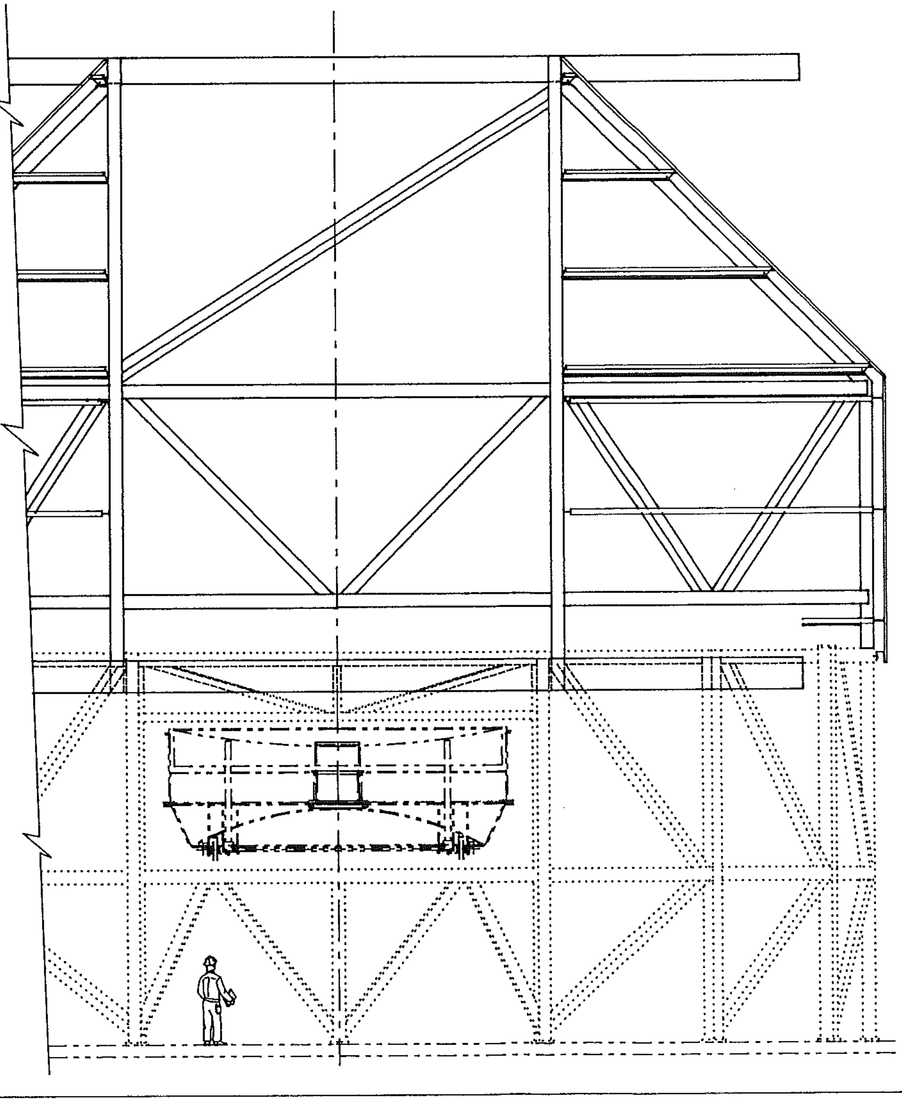
GENERAL NOTES

UNLESS OTHERWISE NOTED

1 SEE SHEET 2 FOR SHUTTER AND MISC. VIEWS.
2 SEE SHEET 3 FOR TRUCKS AND SIDE ROLLERS.
3 SEE SHEET 4 FOR OBSERVATORY VENTILATION.
4 SEE SHEETS 5 & 6 FOR WINDSCREEN AND MOONROOF.
5 SEE SHEET 7 FOR JIB CRANE.
6 SEE SHEET 8 FOR SECONDARY MIRROR HANDLING PLATFORM.
7 STATIONARY BUILDING PRELIMINARY DESIGN BY OTHERS.
8 VENT DOORS AND FRAMING NOT SHOWN THIS DRAWING.
9 WEIGHT ESTIMATE:
   I. STRUCTURAL STEEL, ROTATING BUILDING:
      1. TS 10 X 10 X 1/4 + (1160' TOTAL) = 40,000
      2. TS 24 X 10 X 1/4 (154' TOTAL) = 8,650
      3. TS 16 X 10 X 1/2 (216' TOTAL) = 18,350
      4. TS 8 X 4 X 3/16 (KNEE BRACES) = 1,450
      5. SHUTTER LWR RAIL FAB @ 153#/FT = 9,026
      6. TS 20 X 10 X 1/2 + CAP (UPPER) = 8,827
      7. GIRTS:
         A. W 8 X 10 (398' TOTAL) 4,000
         B. W 8 X 13 (172' TOTAL) 2,250
         C. W 8 X 21 (488' TOTAL) 10,250
         TOTAL = 16,500
   II. SHUTTER STRUCTURAL STEEL (TOTAL FOR 2) 41,000
   III. PREINSULATED PANELS 29,000
   IV. WINDSCREEN/MOONROOF 9,300
   V. JIB CRANE 6,400
   VI. MISC. (RAIL, SHUTTER DRIVES, ETC.) 5,000
   TOTAL ROTATING WEIGHT = 194,000 LBS.

(NOTE – STATIONARY TRUCKS WEIGH AN ADDITIONAL 4,800 LBS.)



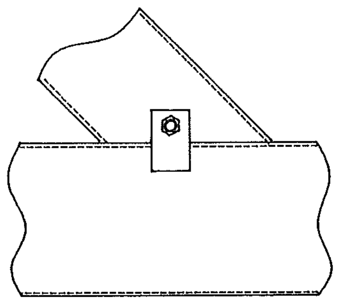


L&F INDUSTRIES HUNTINGTON PARK, CA.	
NEXT ASSEMBLY (PRELIMINARY DESIGN)	MAGELLAN PROJECT 6.5 METER f1.25 TRIPOD-DISK TELESCOPE
ESTIMATED ROTATING WT: 194,000 LBS.	ROTATING ENCLOSURE

	BY	DATE
APVD		
ENGR	SMG	12-4-92
CHK	SMG	12-4-92
DWN	SMG	12-4-92

SCALE	DRAWING NUMBER		REV
1/4" = 1'	E271068	SHT 1 OF 8	A

LTR	DESCRIPTION OF CHANGE	APPROVED
A	MISC. REVISIONS PRIOR TO REPORT 37 SMG 3-27-93	



TYPICAL CONNECTION, ENCLOSURE STRUCTURE

SCALE: 1/4

3/4" BOLT THRU FOR PREASSEMBLY – FIELD WELD ALL AROUND ON SITE

GENERAL NOTES

UNLESS OTHERWISE NOTED

1 SHUTTER WEIGHT ESTIMATE:

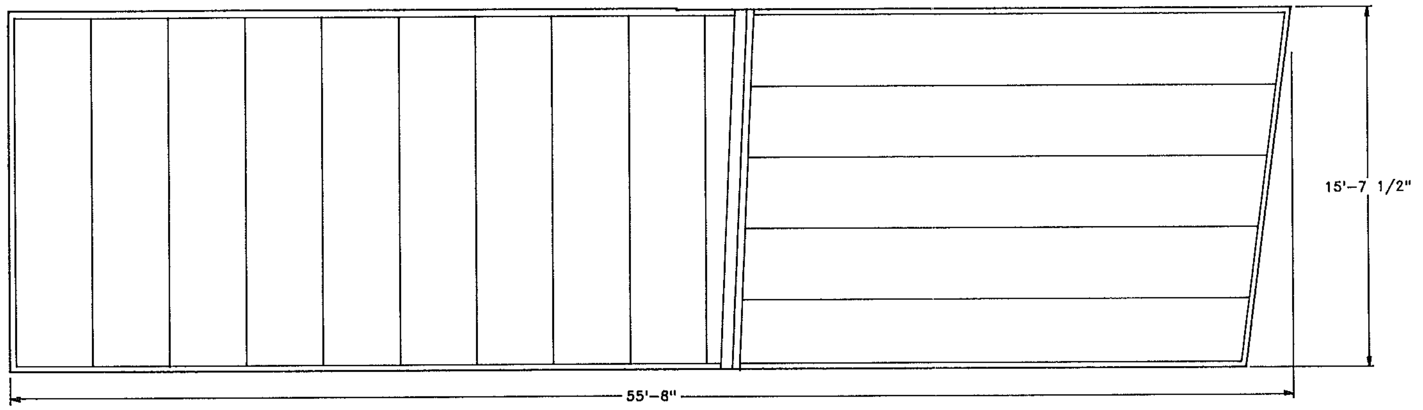
I. STRUCTURAL STEEL, ONE SHUTTER:

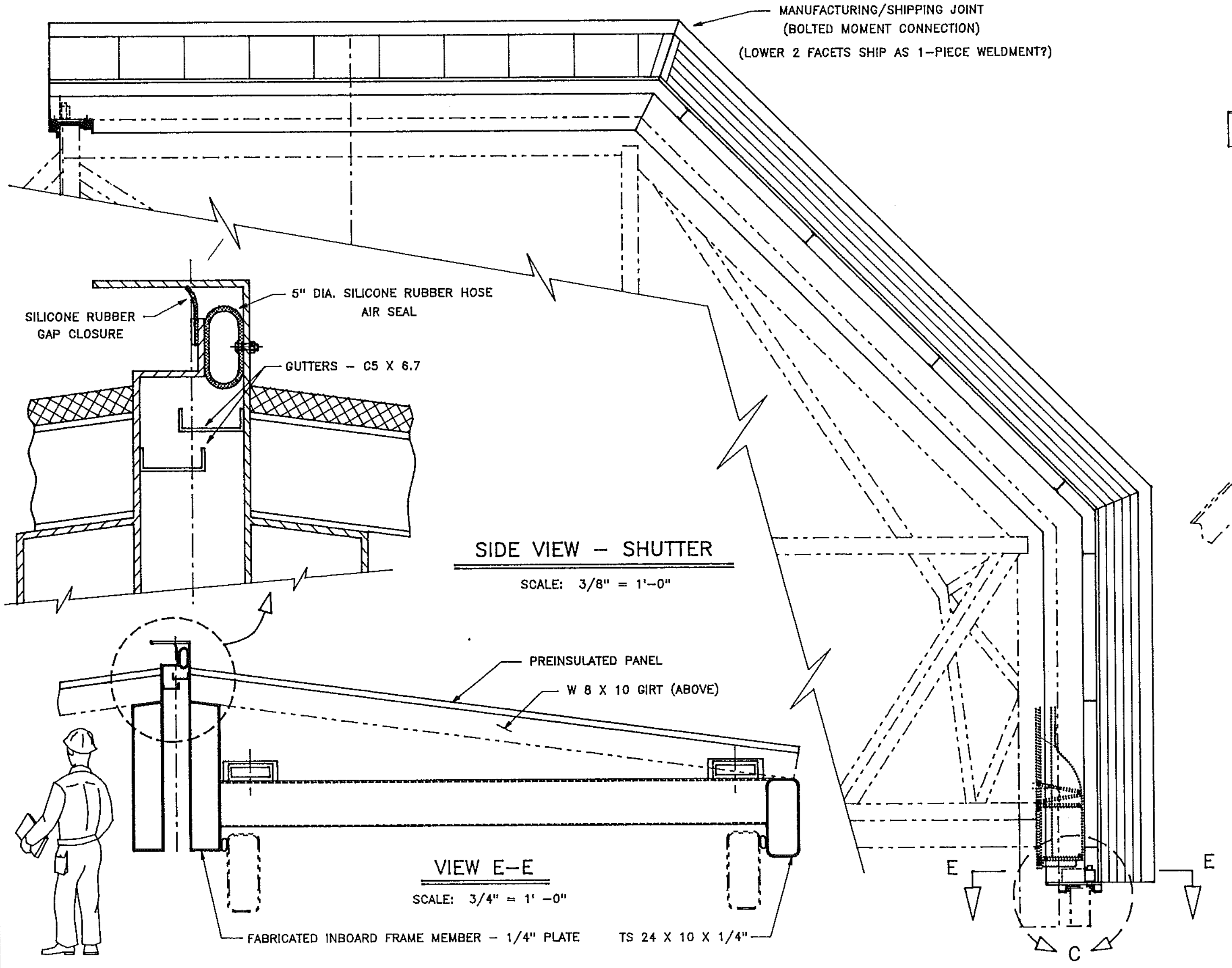
1. FABRICATED INBOARD MEMBER = 9,200
2. TS 24 X 10 X 1/4 (78' TOTAL) = 4,400
3. MISC. STRUCTURE = 3,000
4. TS 12 X 4 X 3/16 BRACES (95') = 1,865
5. GIRTS W 8 X 10 (205' TOTAL) = 2,050

STRUCTURAL STEEL TOTAL EACH SHUTTER = 21,600 LBS.

II. PREINSULATED PANELS 4,400

TOTAL WT EACH SHUTTER = 25,000 LBS.



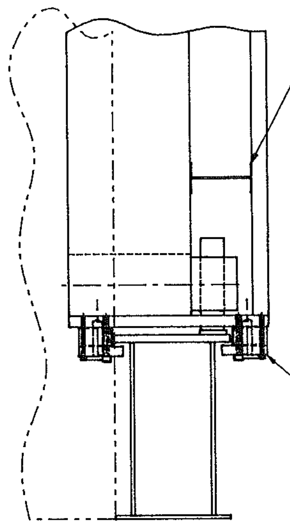


SIDE VIEW – SHUTTER

SCALE: 3/8" = 1'-0"

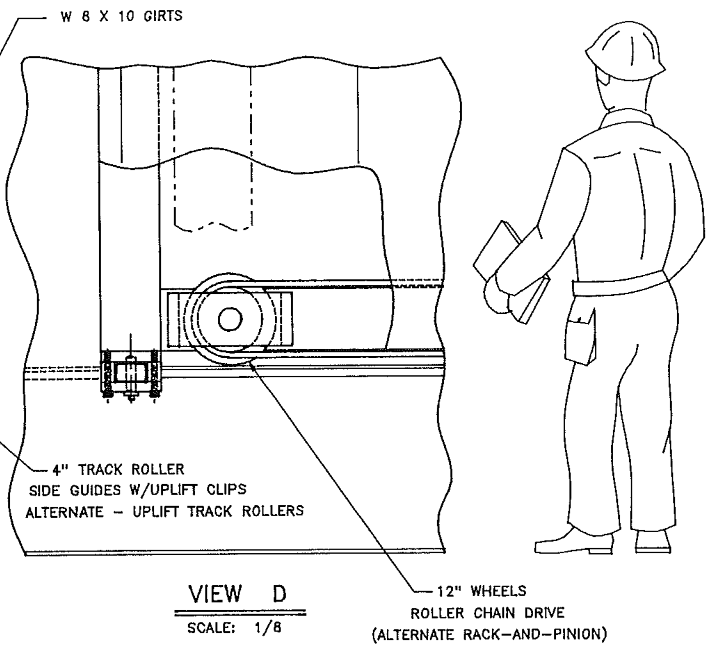
VIEW E–E

SCALE: 3/4" = 1' -0"



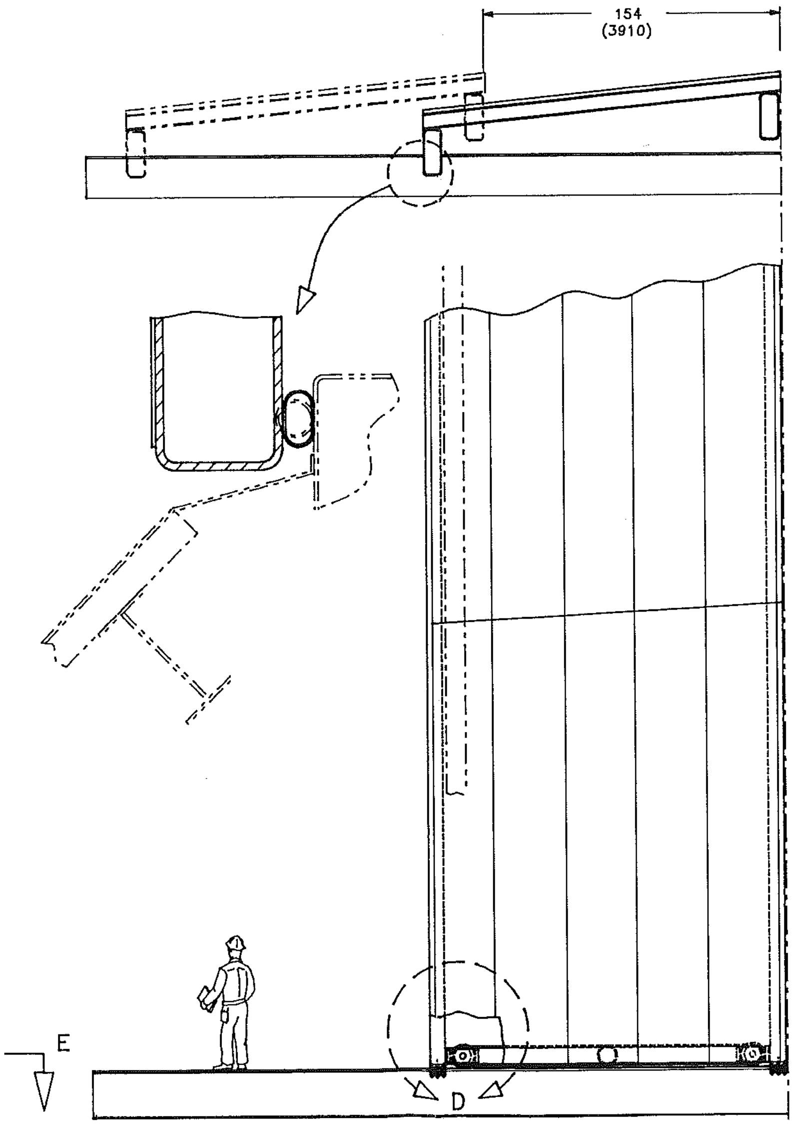
VIEW C

SCALE: 1/8

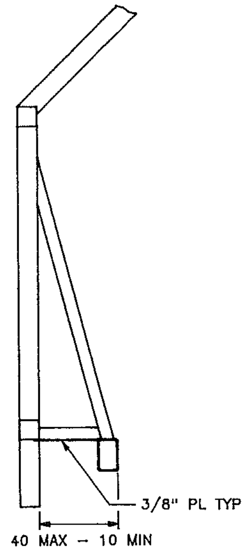


VIEW D

SCALE: 1/8



FRONT VIEW – SHUTTER



SECTION A–A

SHT 1

SCALE: 3/8"=1'-0"

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NEXT ASSEMBLY
(PRELIMINARY DESIGN)

ESTIMATED ROTATING WT:

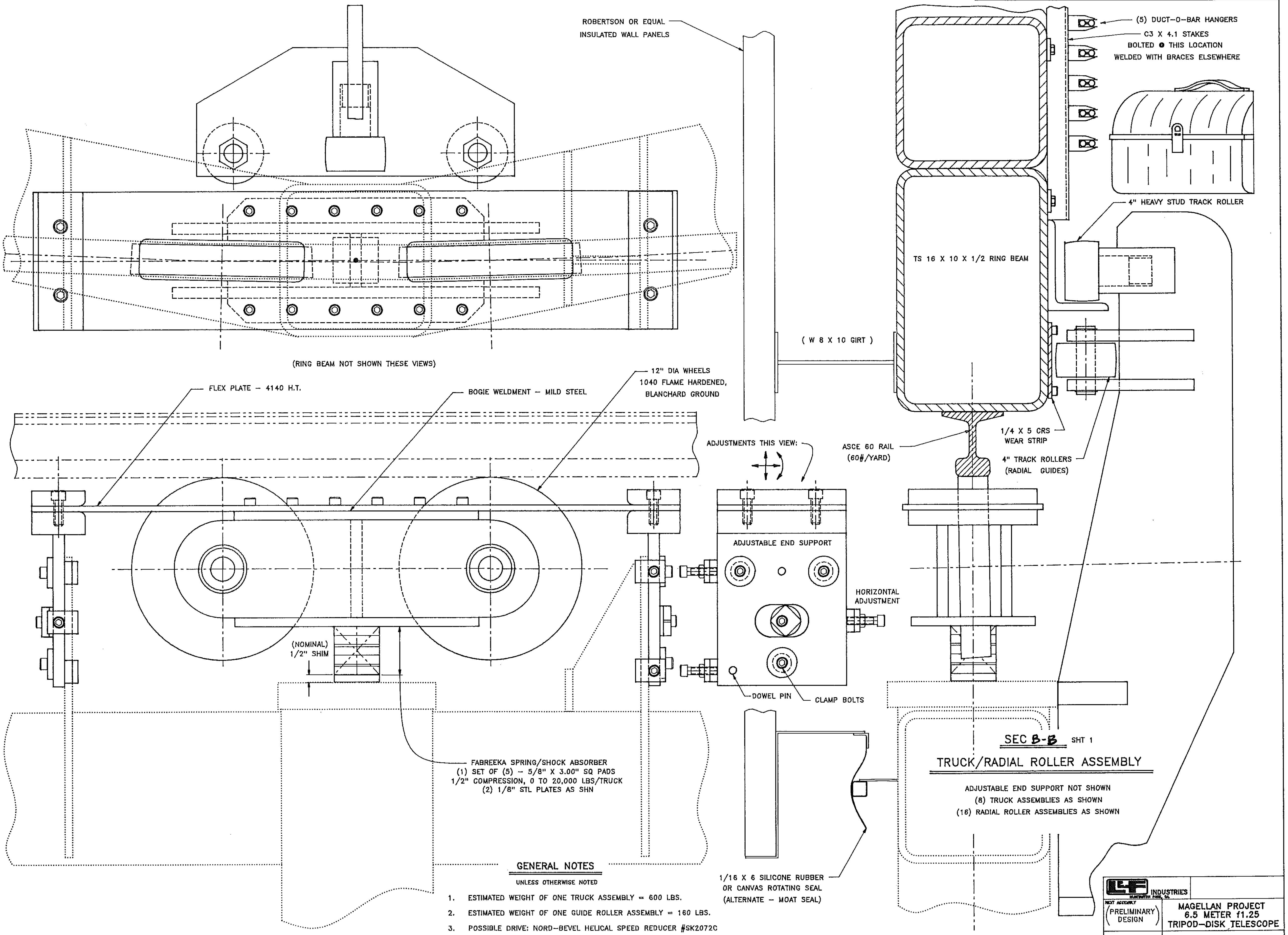
MAGELLAN PROJECT
6.5 METER f1.25
TRIPOD–DISK TELESCOPE

ROTATING ENCLOSURE
BI–PARTING SHUTTERS

	BY	DATE
APVD		
ENGR	SMG	12-4-92
CHK	SMG	12-4-92
DWN	SMG	12-4-92

SCALE NOTED
DRAWING NUMBER E271068
SHT 2 OF 8
REV A

LTR	DESCRIPTION OF CHANGE	APPROVED
A	ADDED ALIGNMENT ADJUSTMENT, SLIP RINGS, ETC. SMG 7-26-93	



GENERAL NOTES

UNLESS OTHERWISE NOTED

1. ESTIMATED WEIGHT OF ONE TRUCK ASSEMBLY = 600 LBS.
2. ESTIMATED WEIGHT OF ONE GUIDE ROLLER ASSEMBLY = 160 LBS.
3. POSSIBLE DRIVE: NORD-BEVEL HELICAL SPEED REDUCER #SK2072C "C" FACE AND FLG MTG. HOLLOW SHAFT - APPROX 74:1 RATIO MOTOR BRKT FOR NEMA 213/215 "C" FACE 10 H.P. DC MOTOR. (2) DRIVES REQUIRED (AT 180° LOCATIONS).

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HUNTINGTON PARK, CA.

NEXT ASSEMBLY
(PRELIMINARY DESIGN)

MAGELLAN PROJECT
6.5 METER f1.25
TRIPOD-DISK TELESCOPE

ROTATING ENCLOSURE
TRUCK ASSEMBLY

	BY	DATE
APVD		
ENGR	SMG	2-25-93
CHK	SMG	2-25-93
DWN	SMG	2-25-93

SCALE 1/2

DRAWING NUMBER E271068

SHT 3 OF 8

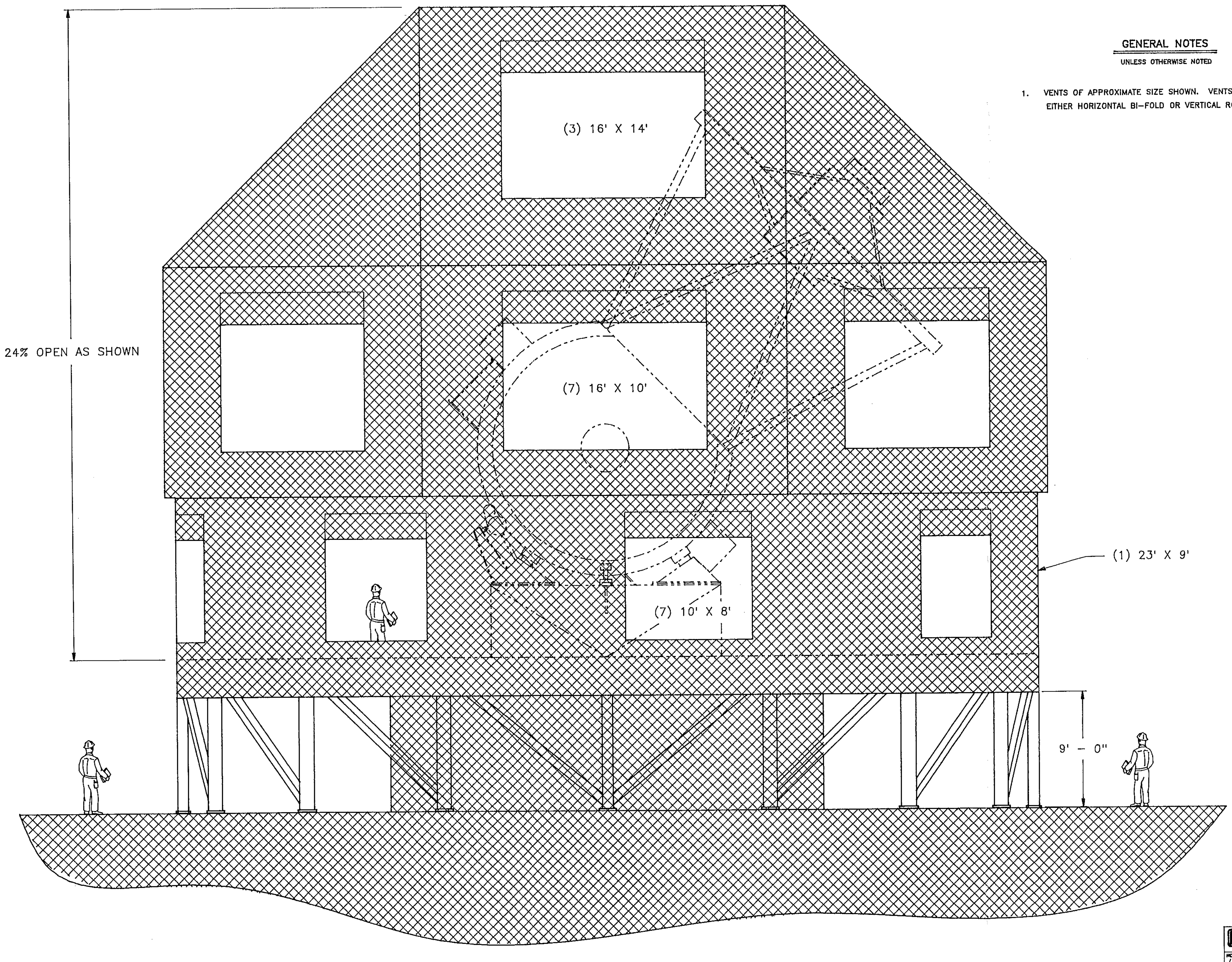
REV A

LTR	DESCRIPTION OF CHANGE	APPROVED

GENERAL NOTES

UNLESS OTHERWISE NOTED

1. VENTS OF APPROXIMATE SIZE SHOWN. VENTS WILL CONSIST OF EITHER HORIZONTAL BI-FOLD OR VERTICAL ROLLUP TYPE DOORS.



OBSERVATORY VENTILATION

INDUSTRIES

NEXT ASSEMBLY

(PRELIMINARY DESIGN)

ESTIMATED ROTATING WT:

MAGELLAN PROJECT
6.5 METER f1.25
TRIPOD-DISK TELESCOPE

ROTATING ENCLOSURE
OBSERVATORY VENTILATION

	BY	DATE
APVD		
ENGR	SNG	2-16-93
CHK	SNG	2-16-93
DWN	SNG	2-16-93

SCALE 3/8" = 1'

DRAWING NUMBER E271068

SHT 4 OF 6

REV

LTR	DESCRIPTION OF CHANGE	APPROVED
A	ROTATED STORED POSITION FOR MOON ROOF SMG 3-8-93	

GENERAL NOTES

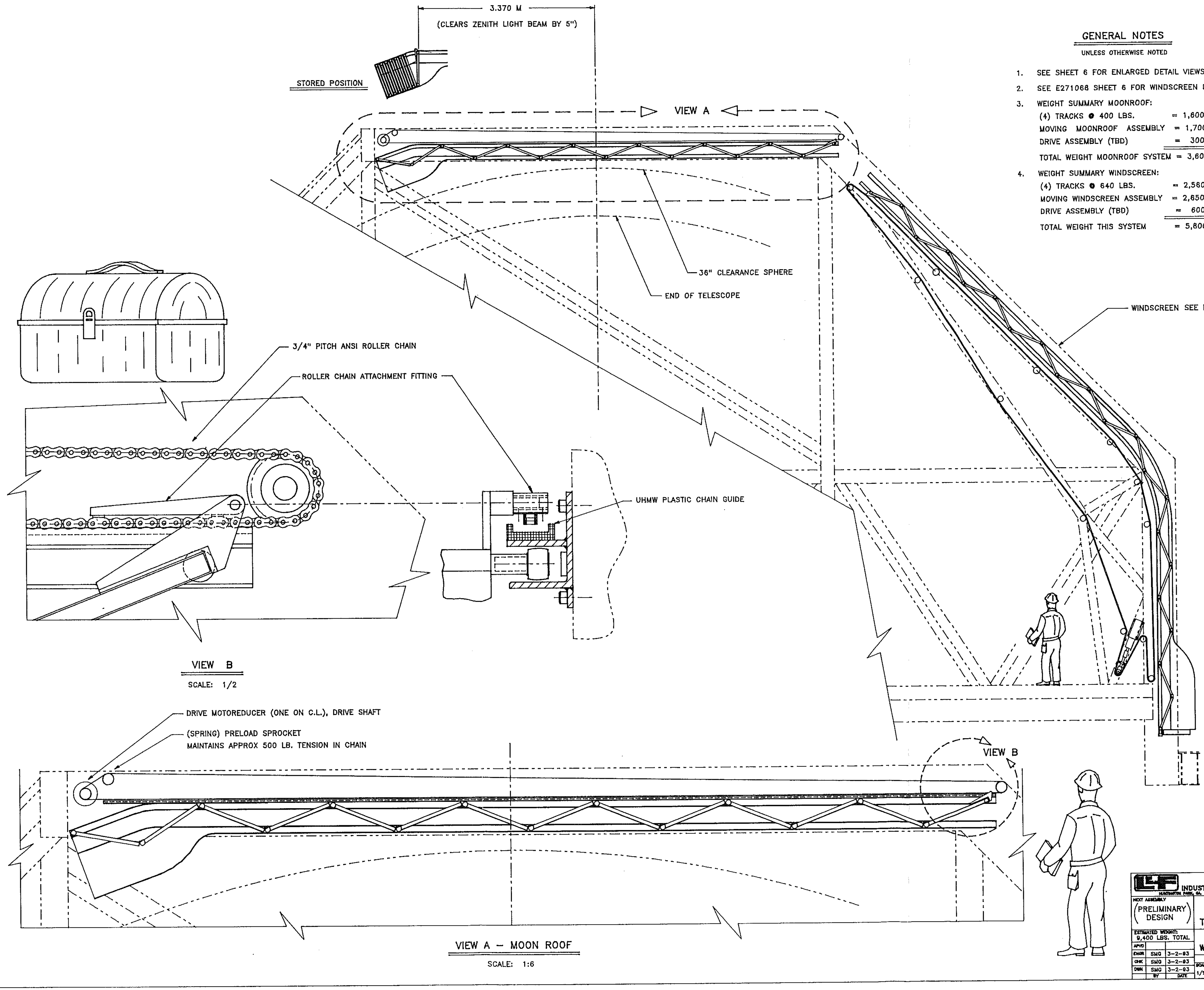
UNLESS OTHERWISE NOTED

1. SEE SHEET 6 FOR ENLARGED DETAIL VIEWS.
2. SEE E271068 SHEET 6 FOR WINDSCREEN DETAILS.
3. WEIGHT SUMMARY MOONROOF:

(4) TRACKS @ 400 LBS.	= 1,600
MOVING MOONROOF ASSEMBLY	= 1,700
DRIVE ASSEMBLY (TBD)	= 300
TOTAL WEIGHT MOONROOF SYSTEM	= 3,600 LBS.

4. WEIGHT SUMMARY WINDSCREEN:

(4) TRACKS @ 640 LBS.	= 2,560
MOVING WINDSCREEN ASSEMBLY	= 2,650
DRIVE ASSEMBLY (TBD)	= 600
TOTAL WEIGHT THIS SYSTEM	= 5,800 LBS.



VIEW B

SCALE: 1/2

VIEW A – MOON ROOF

SCALE: 1:6

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HUNTINGTON PARK, CA.

NEXT ASSEMBLY
(PRELIMINARY DESIGN)

MAGELLAN PROJECT
6.5 METER f1.25
TRIPOD–DISK TELESCOPE

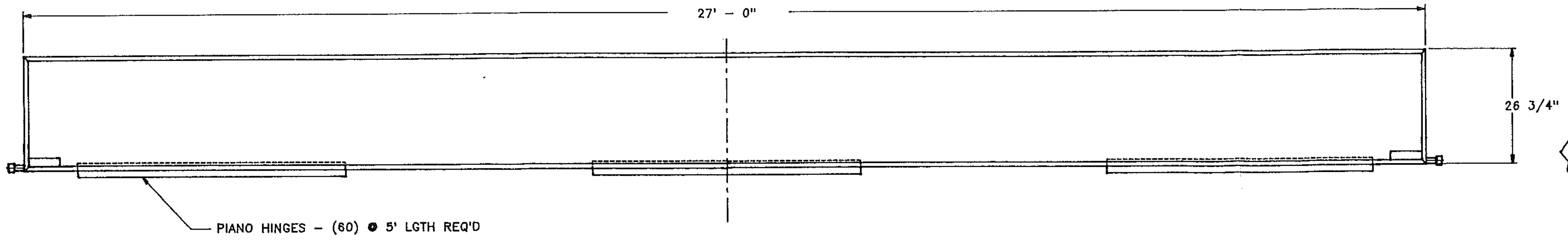
ESTIMATED WEIGHT:
9,400 LBS. TOTAL

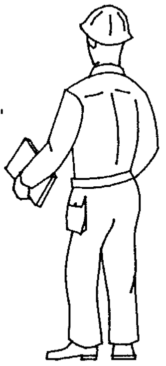
ROTATING ENCLOSURE
WINDSCREEN AND MOON ROOF

	BY	DATE
APVD		
ENGR	SMG	3-2-93
CHK	SMG	3-2-93
DWN	SMG	3-2-93

SCALE 1/2" = 1'
DRAWING NUMBER E271068
SHT 5 OF 8
REV A

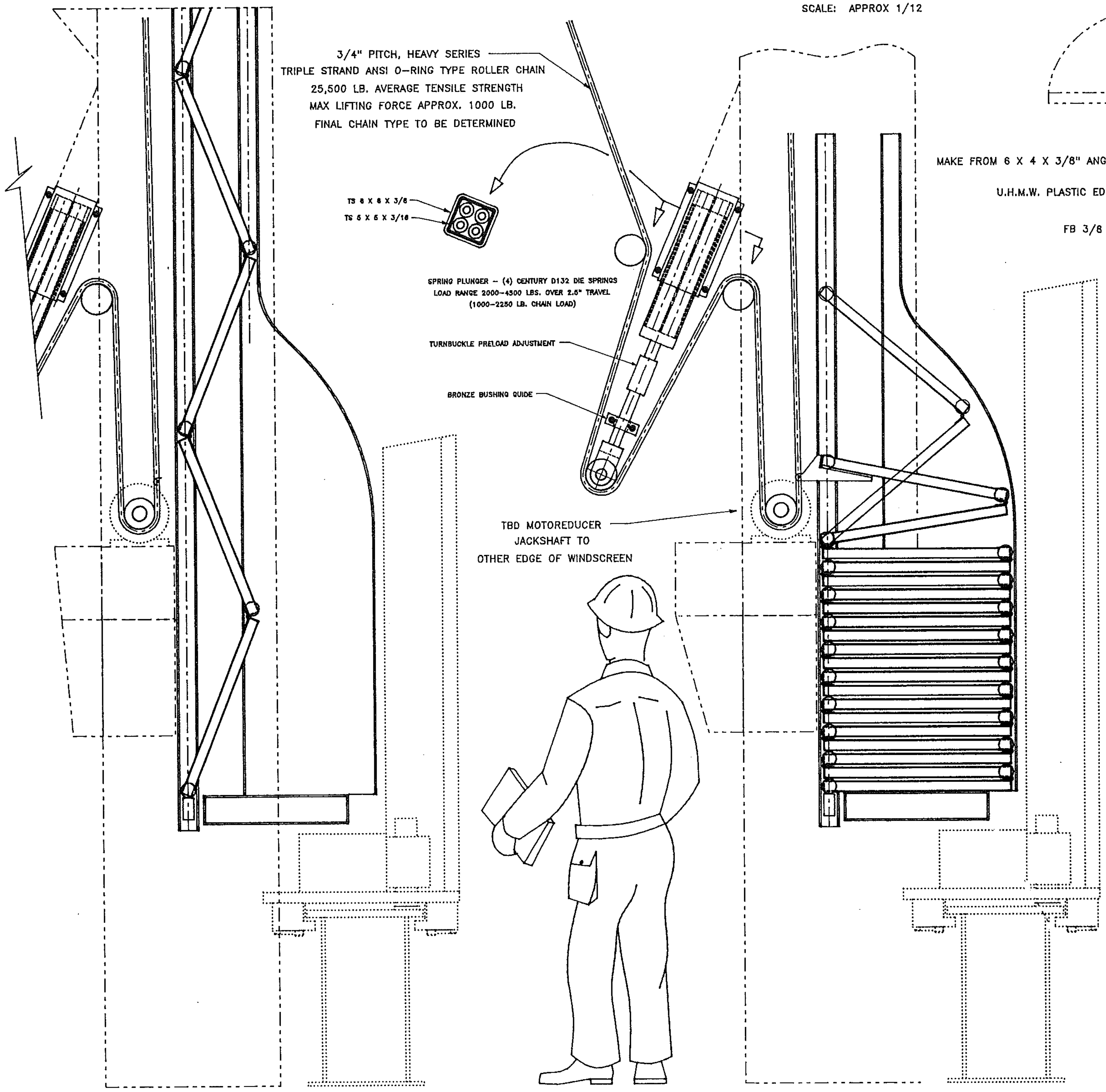
LTR	DESCRIPTION OF CHANGE	APPROVED
A	MISC. REVISIONS PRIOR TO REPORT NO. 37. SMG 3-28-93	





TYPICAL PANEL - (20) REQUIRED

SCALE: APPROX 1/12

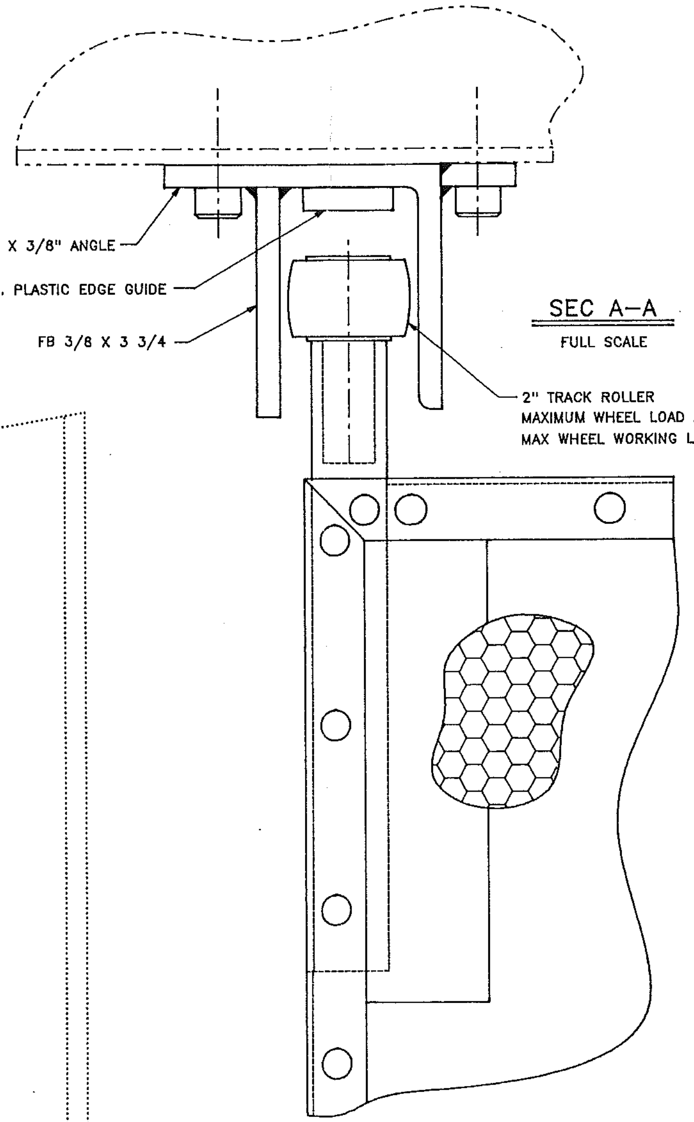


SCALE: 1/6

SCALE: 1/6

SEC A-A

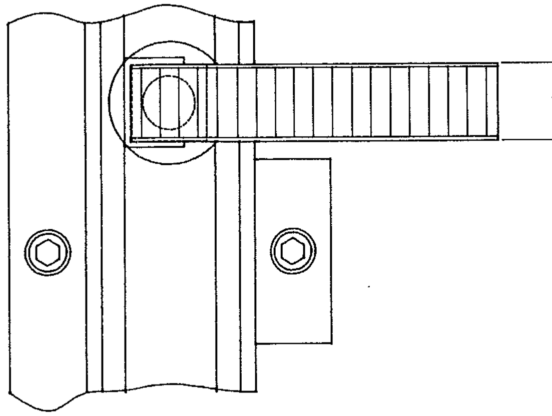
FULL SCALE



GENERAL NOTES

UNLESS OTHERWISE NOTED

1. SEE SHEET 5 FOR MAIN VIEW.



L&F INDUSTRIES
HUNTINGTON PARK, CA

NEXT ASSEMBLY
(PRELIMINARY DESIGN)

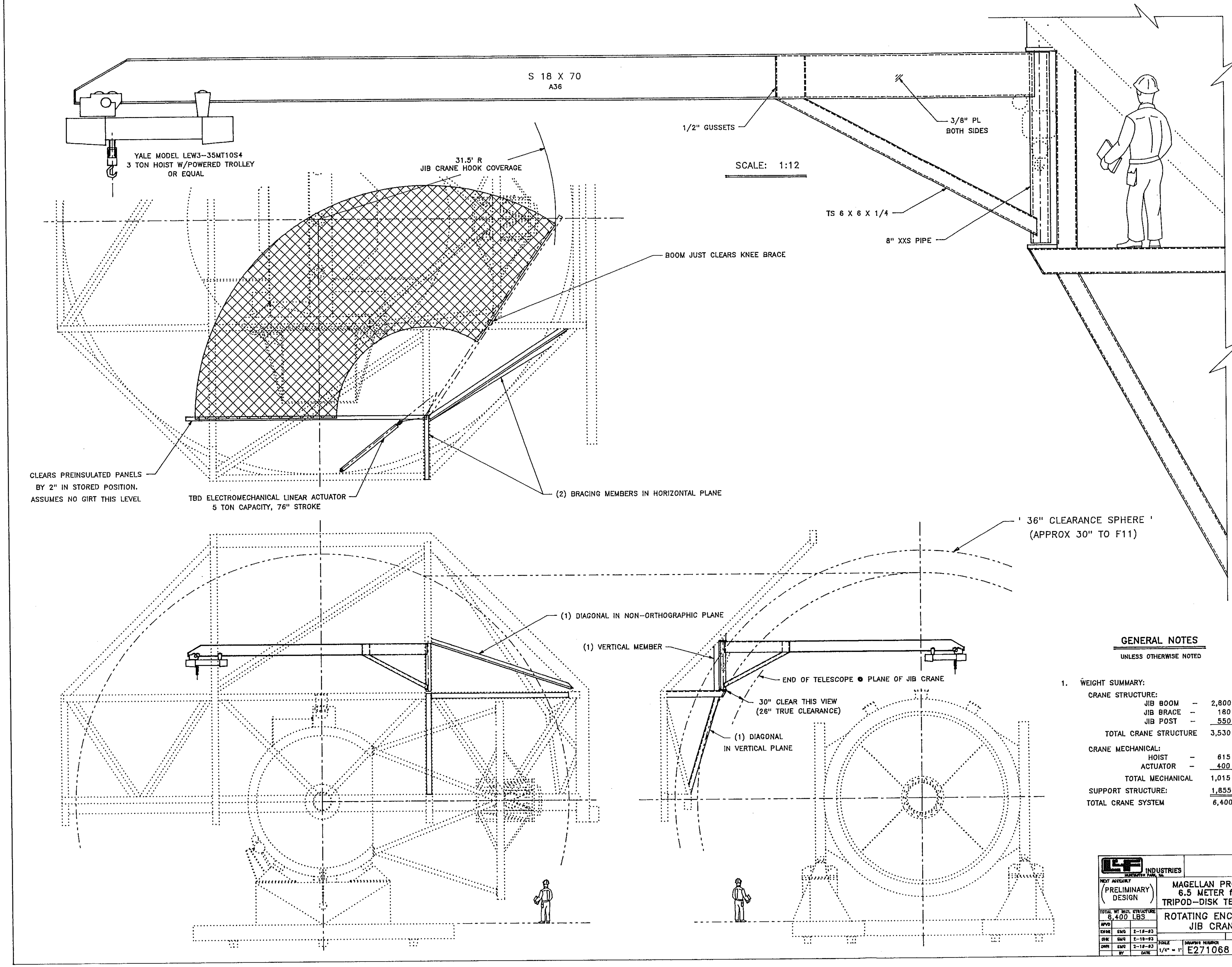
MAGELLAN PROJECT
6.5 METER f1.25
TRIPOD-DISK TELESCOPE

ROTATING ENCLOSURE
WINDSCREEN DETAILS

	BY	DATE
APVD		
ENGR	SMG	2-25-93
CHK	SMG	2-25-93
DWN	SMG	2-25-93

SCALE NOTED
DRAWING NUMBER E271068
SHT 6 OF 8
REV A

LTR	DESCRIPTION OF CHANGE	APPROVED
A	REVISED DWG NO. (WAS E271072) SMG 3-28-93	



GENERAL NOTES

UNLESS OTHERWISE NOTED

1. WEIGHT SUMMARY:

CRANE STRUCTURE:	
JIB BOOM –	2,800
JIB BRACE –	180
JIB POST –	550
TOTAL CRANE STRUCTURE	3,530
CRANE MECHANICAL:	
HOIST –	615
ACTUATOR –	400
TOTAL MECHANICAL	1,015
SUPPORT STRUCTURE:	1,855
TOTAL CRANE SYSTEM	6,400 LBS.

L&F INDUSTRIES
HUNTINGTON PARK, CA

NEXT ASSEMBLY
(PRELIMINARY DESIGN)

MAGELLAN PROJECT
6.5 METER f1.25
TRIPOD–DISK TELESCOPE

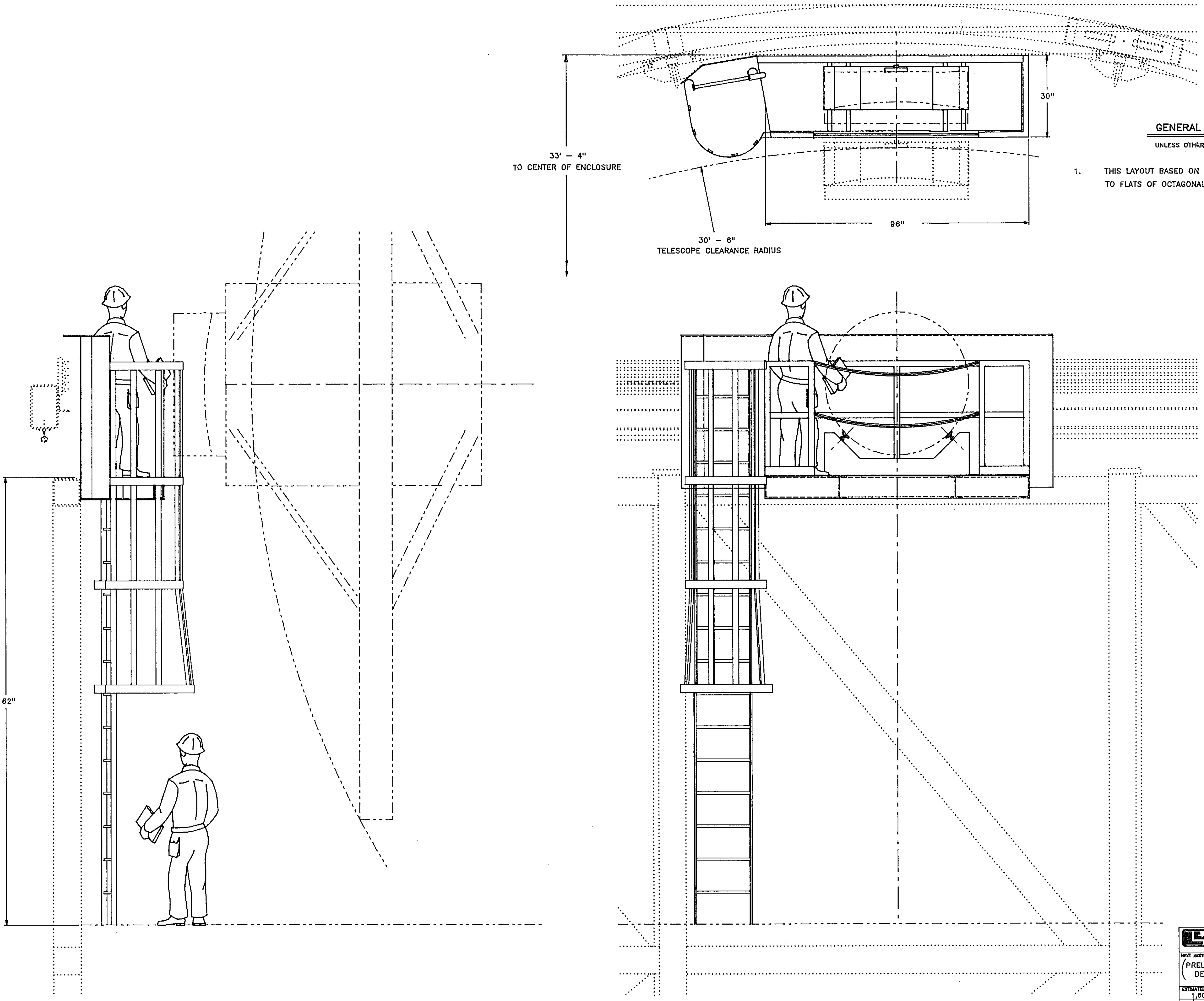
TOTAL WT INCL STRUCTURE
6,400 LBS

ROTATING ENCLOSURE
JIB CRANE

	BY	DATE
APVD		
ENGR	SMG	2-10-93
CHK	SMG	2-10-93
DWN	SMG	2-10-93

SCALE 1/4" = 1'
DRAWING NUMBER E271068
SHT 7 OF 8
REV A

LTR	DESCRIPTION OF CHANGE	APPROVED
A	REVISED TO STATIONARY PLATFORM FOR 34' ROTATING ENCLOSURE SMG 3-29-93	



GENERAL NOTES

UNLESS OTHERWISE NOTED

1. THIS LAYOUT BASED ON 34' INSIDE CLEARANCE RADIUS TO FLATS OF OCTAGONAL ROTATING ENCLOSURE.

L-F INDUSTRIES
HUNTINGTON PARK, CA.

NEXT ASSEMBLY
(PRELIMINARY DESIGN)

MAGELLAN PROJECT
6.5 METER f1.25
TRIPOD–DISK TELESCOPE

ESTIMATED WEIGHT:
1,600 LBS.

ROTATING ENCLOSURE
SECONDARY PLATFORM

	BY	DATE
APVD		
ENGR	SMG	2-16-93
CHK	SMG	2-16-93
DWN	SMG	2-16-93

SCALE 1" = 1'
DRAWING NUMBER E271068
SHT 8 OF 8
REV A