ENHANCED BIOMASS

(TIRE RECYCLING)

ADDITIONAL INFORMATION

AND

ANSWERS TO SPECIFIC QUESTIONS

TURN-KEY EQUIPMENT LIST

1. Shredder
2. Large Granulator
3. Hopper Feeder
4. Infeed Conveyor
5. Freezing Chamber
6. 2 Primary Size Reduction Units
7. Screw Conveyor and Bucket Elevator
8. Spark Suppression system
9. Primary Screener
10. Transfer Conveyor
11. Primary Magnetic Separator
12. Dryer
13. Secondary Magnetic Separator
14. Screen Classifier
15. Finished Product Conveyors
16. Storage Units
17. Bagging Unit
18. Compactor
19. PLC Electrical Control System with HMI
20. Dust Collection and Exhaust System

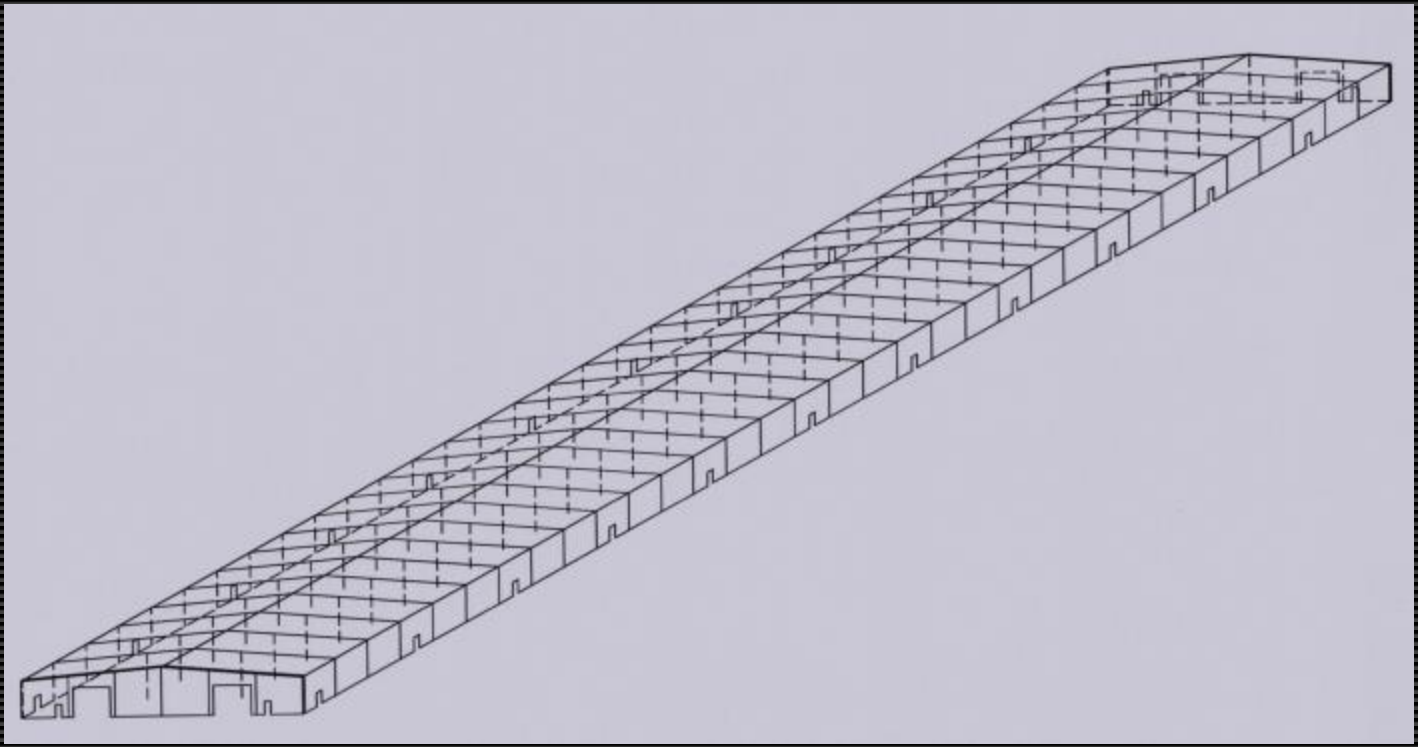
plus

1. Hopper Feeder with variable frequency drive
2. Freeze Chamber with LN2 control valve
3. Size Reduction Unit with VFD drive
4. Dryer
5. Steel Separator
6. Classifier
7. Conveyance systems
8. Dust Collection system
9. PLC Electrical Control System with HMI
10. Storage Units

and

1. Rubber Hopper Feeder
2. Plastics Hopper Feeder
3. Rubber loss of weight feeder
4. Plastic loss of weight feeder
5. Blending Unit with 600 HP motor
6. Side feeder for rubber
7. Underwater pelletizer and dryer
8. Cooling tower or chiller (sized to accommodate all 3 units)
9. Hydraulic screen changer
10. PLC Electrical Control System with HMI
11. Mezzanine for Loss of Weight feeders

BUILDING LAYOUT



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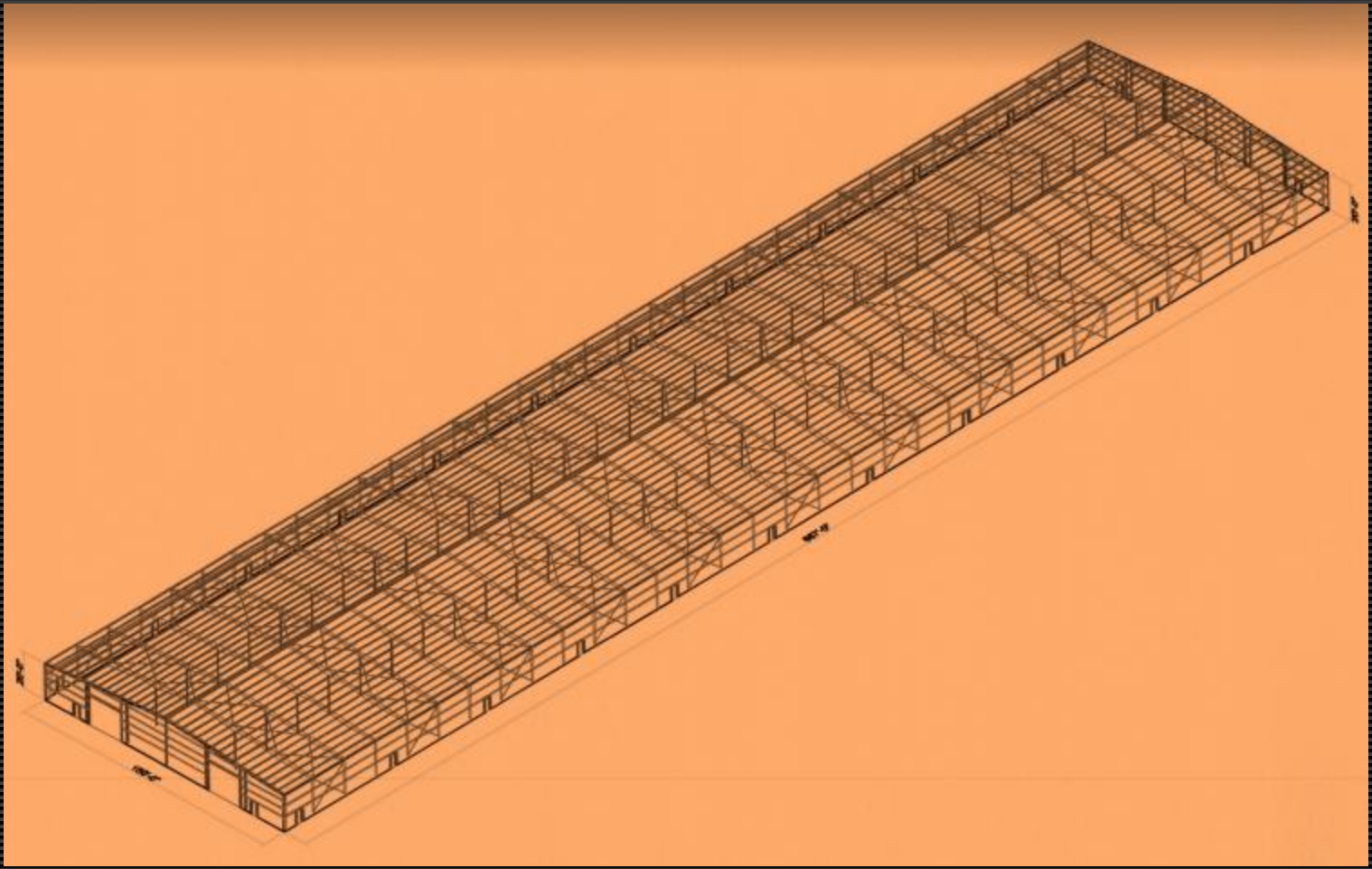

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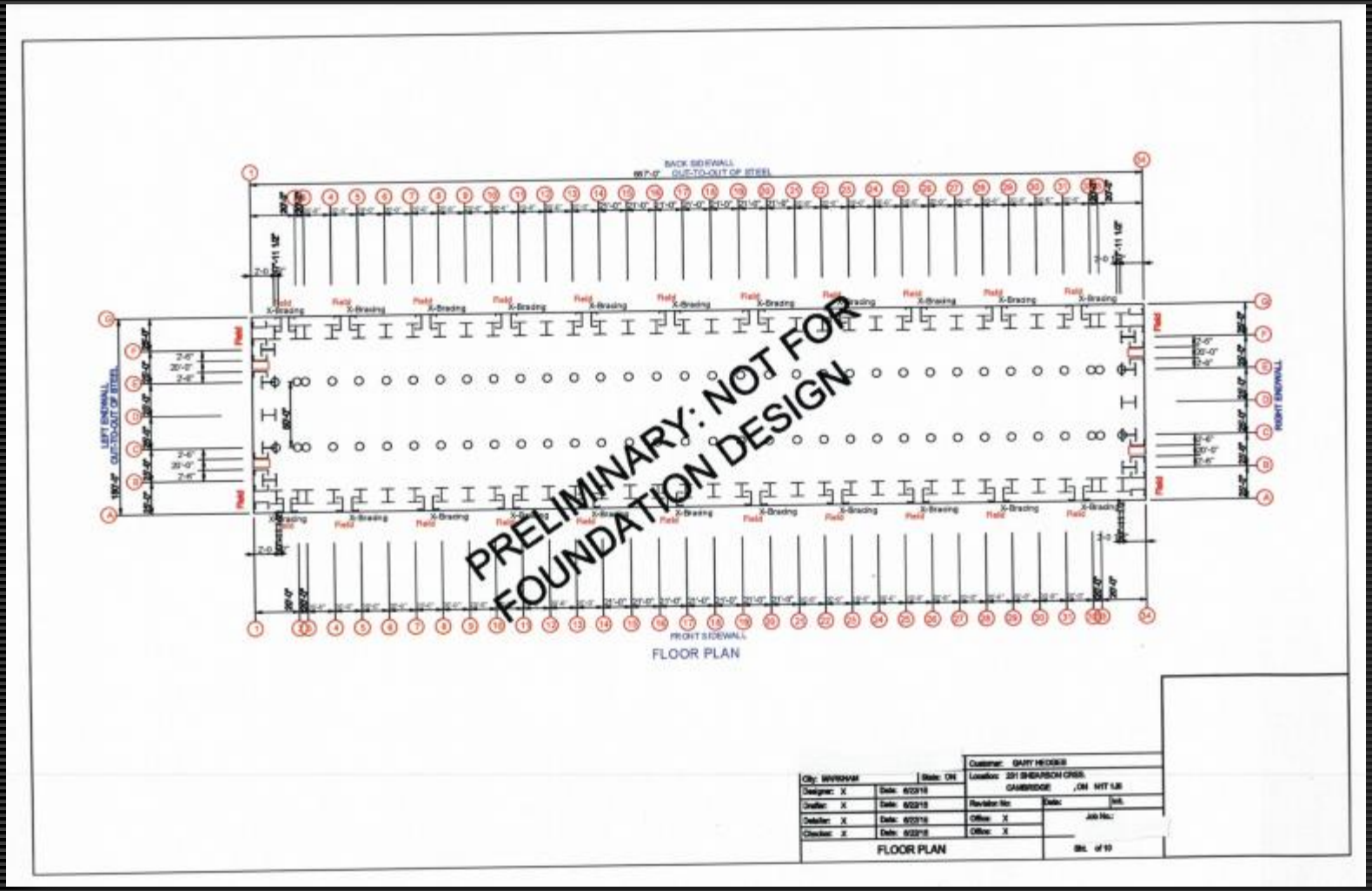

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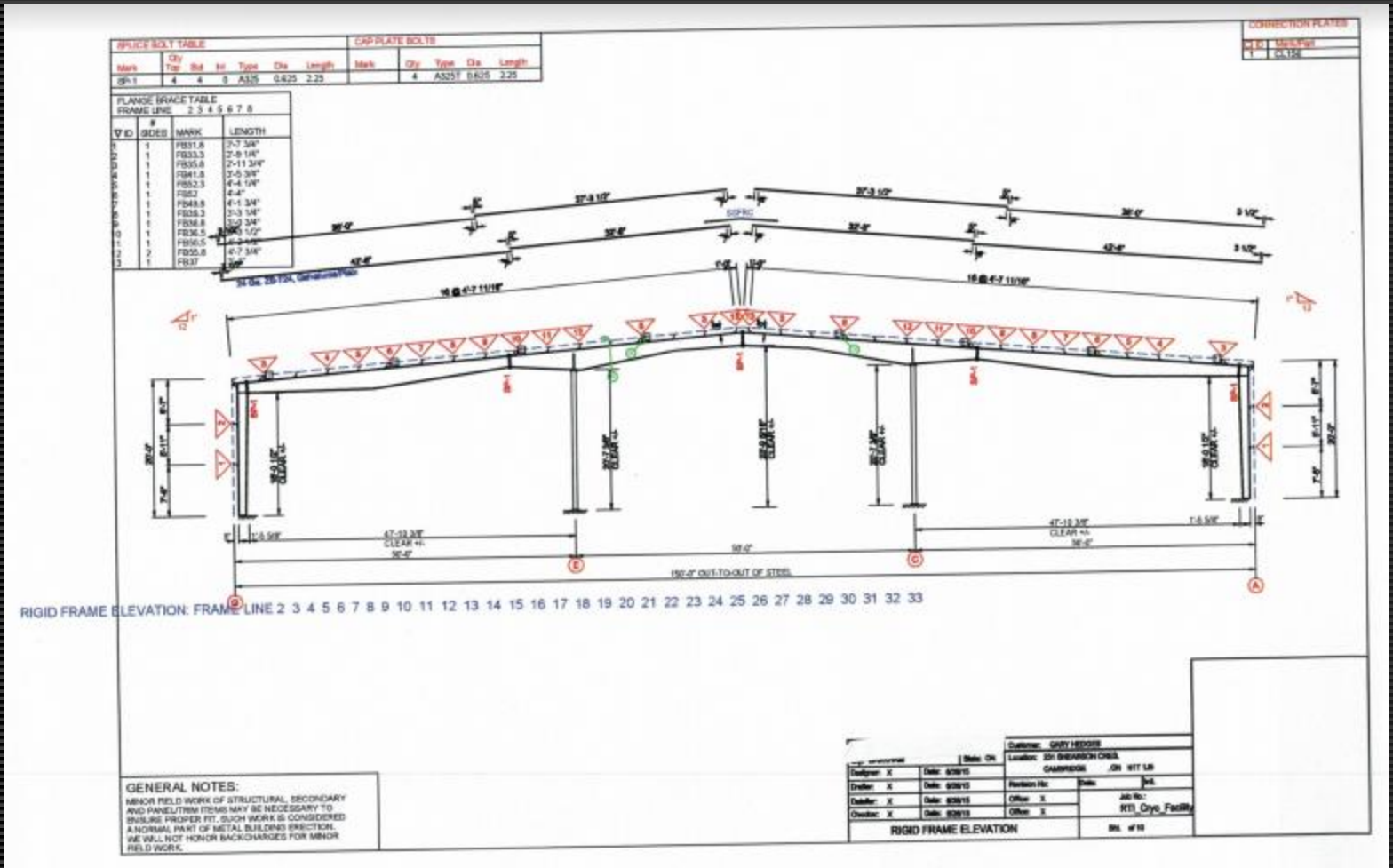

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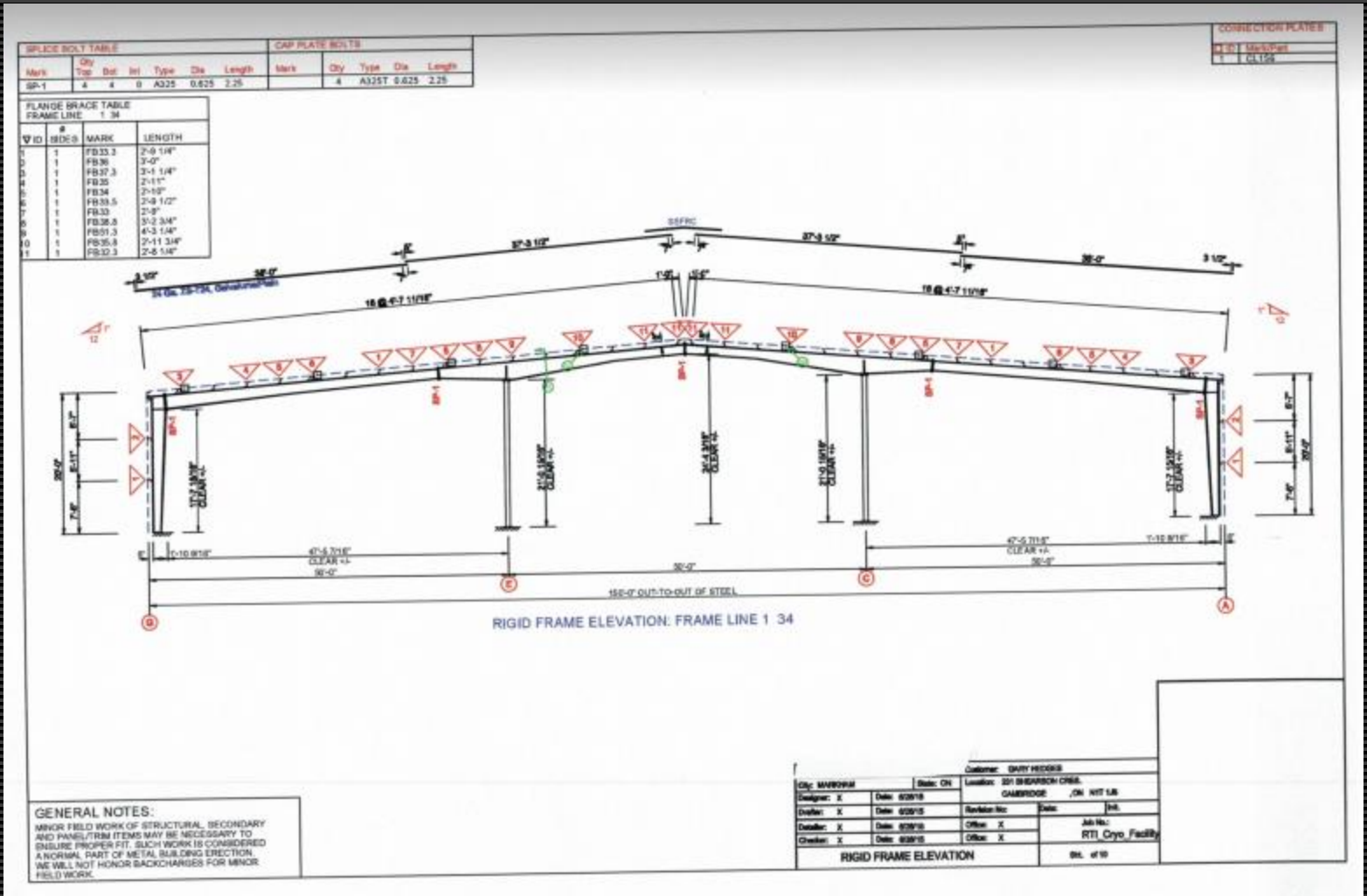

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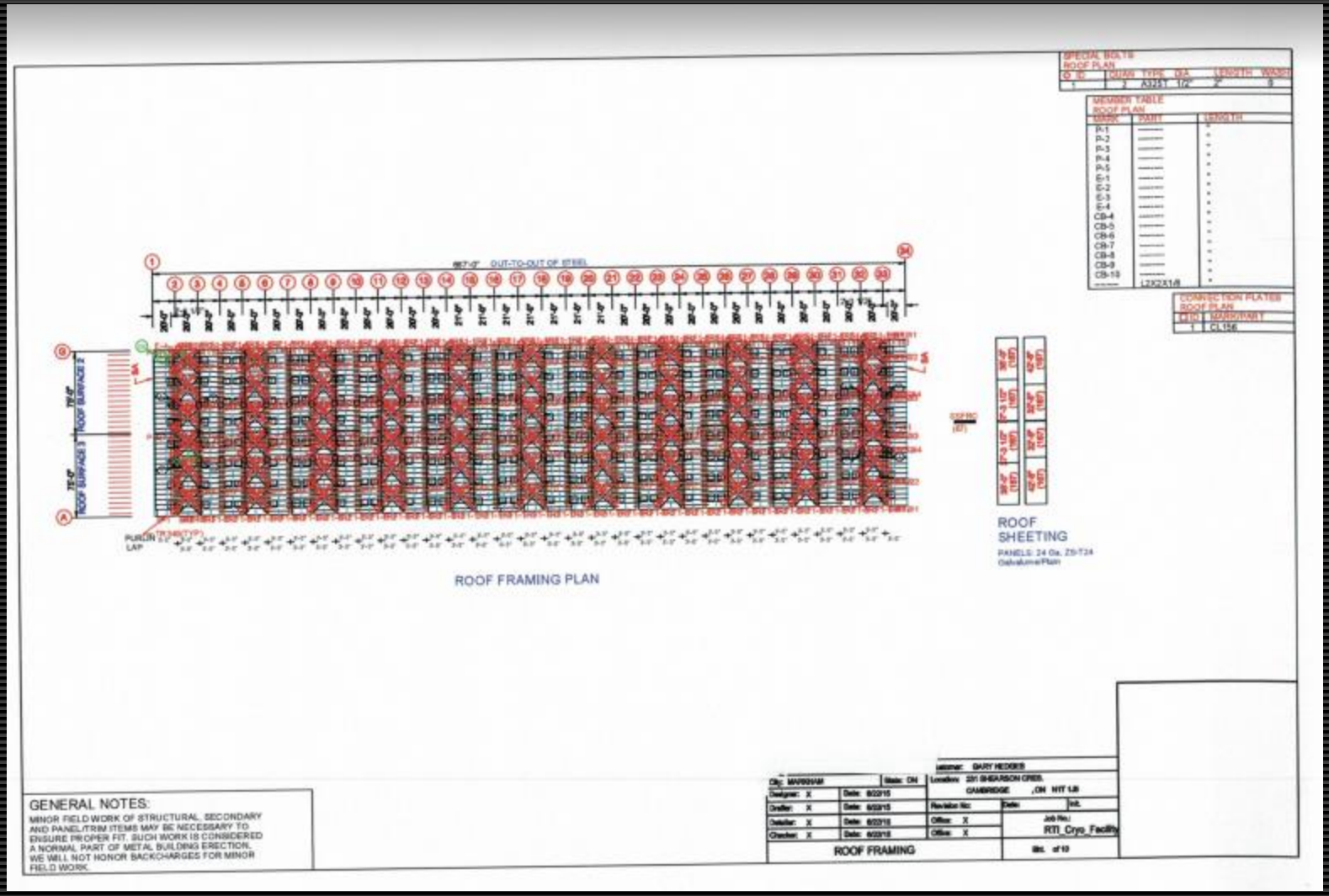

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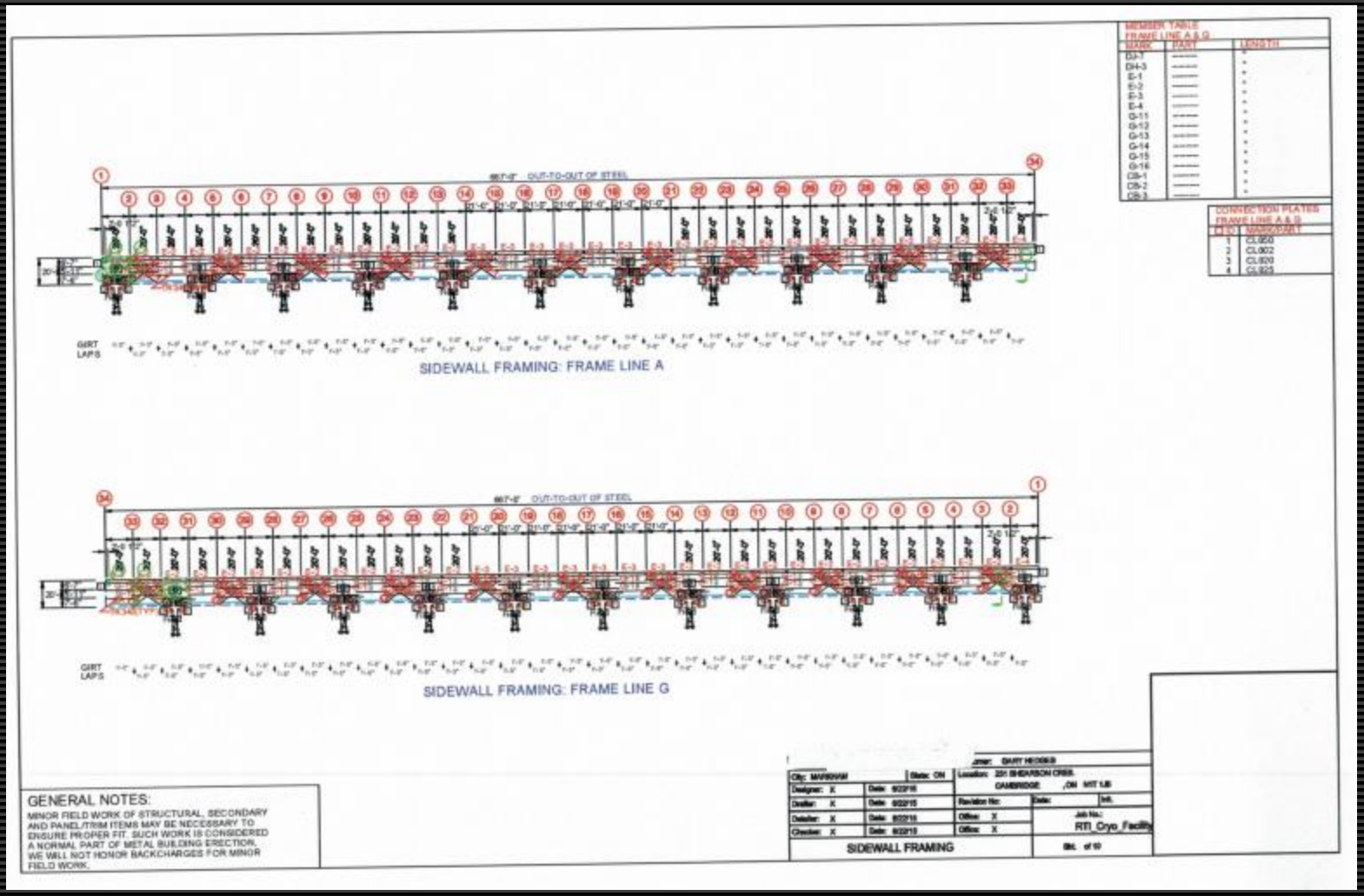

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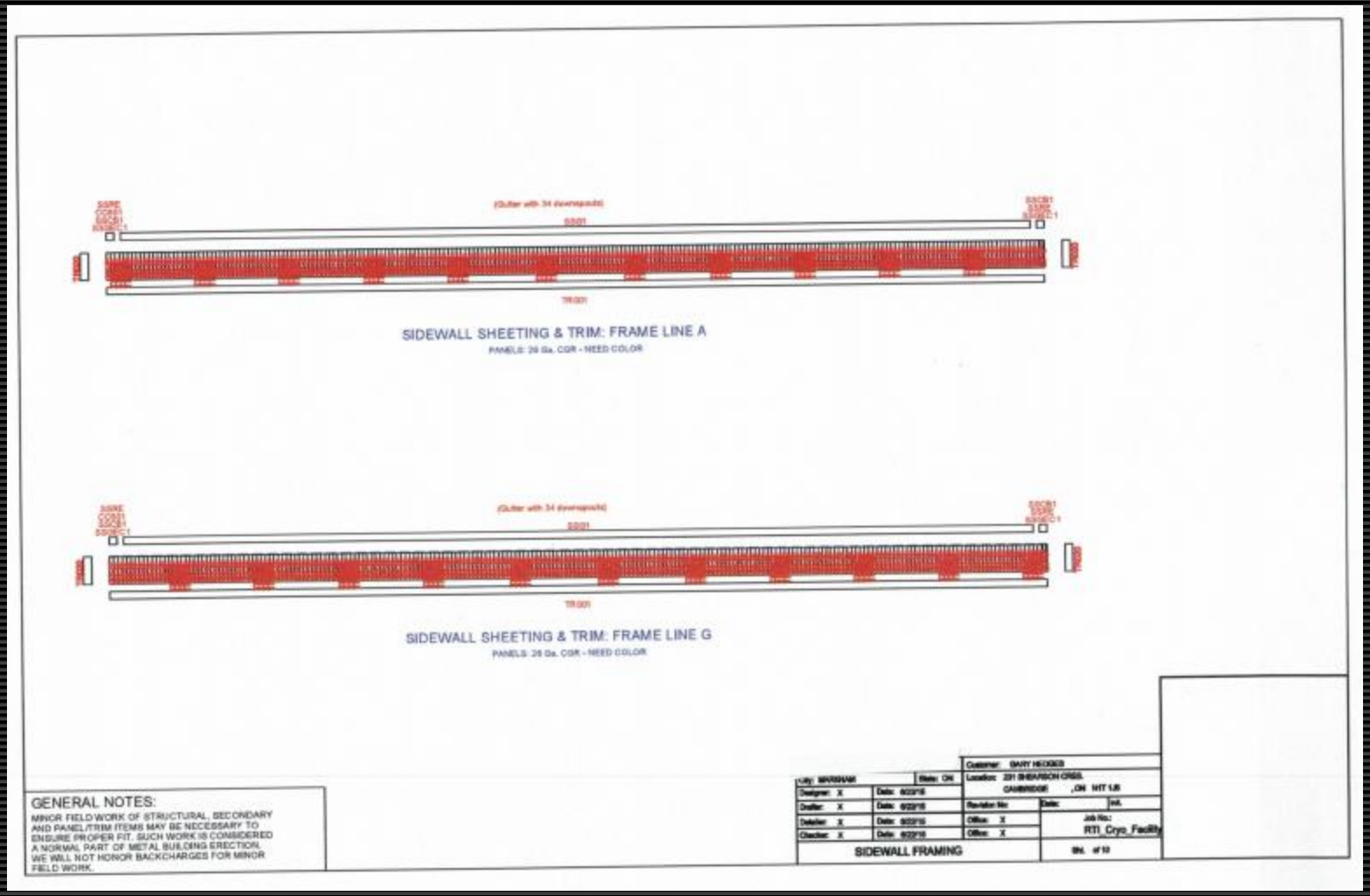

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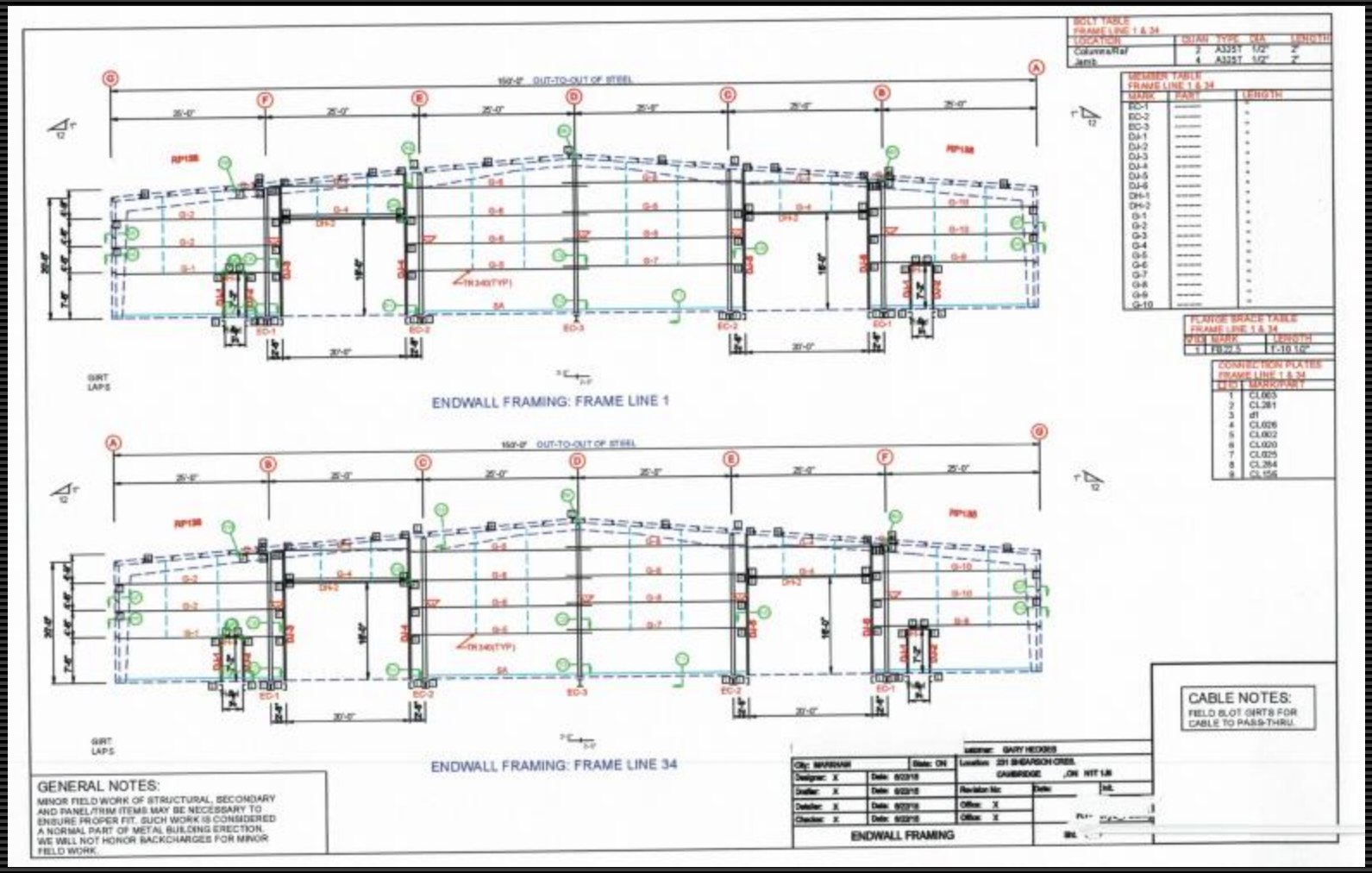


BUILDING LAYOUT

ENDWALL SHEETING & TRIM: FRAME LINE 1

PANELS: 26 Ga. COR - NEED COLOR

ENDWALL SHEETING & TRIM: FRAME LINE 34

PANELS: 26 Ga. COR - NEED COLOR

GENERAL NOTES:

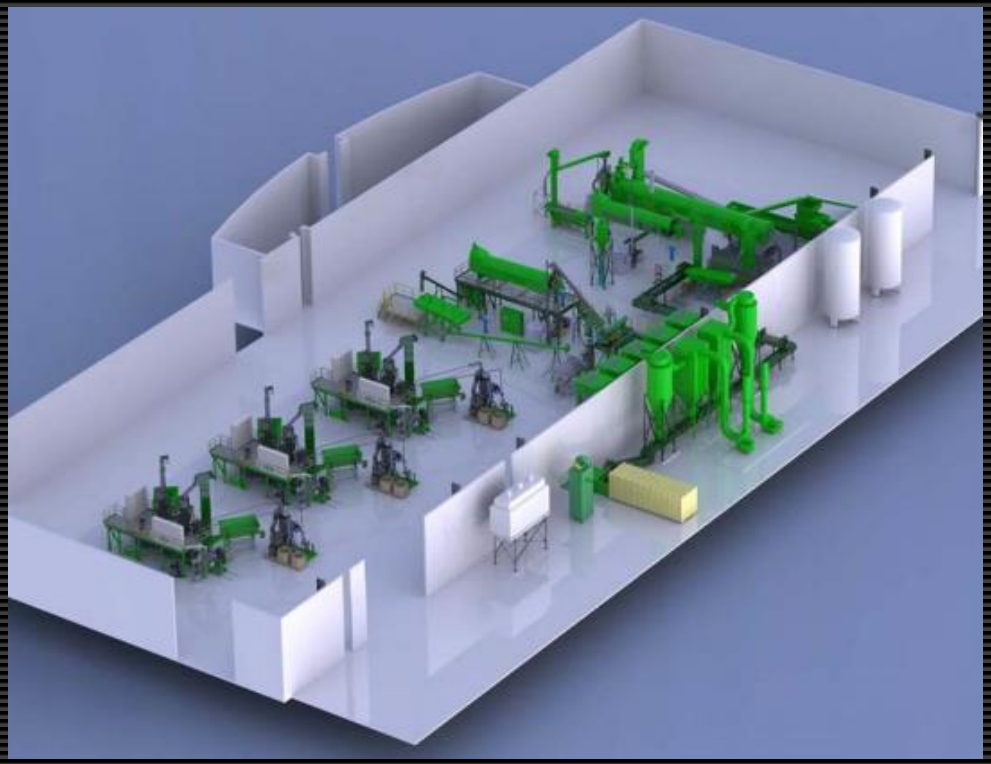
MINOR FIELD WORK OF STRUCTURAL, SECONDARY AND PANEL/TRIM ITEMS MAY BE NECESSARY TO ENSURE PROPER FIT. SUCH WORK IS CONSIDERED

WE WILL NOT HONOR BACKCHARGES FOR MINOR FIELD WORK.

City: WARWAN		State: ON	Customer: GARY HEDGES
Designer: X	Date: 8/22/15		Location: 331 SHEARSON CRES. CAMBRIDGE ,ON N1T 1J8
Drafter: X	Date: 8/22/15		Revision No: Date: NIL
Detailer: X	Date: 8/22/15		Office: X Job No.: RTI_Cryo_Facility
Checker: X	Date: 8/22/15		Office: X

ENDWALL FRAMING

TURNKEY TIRES TO POLYMERS SYSTEM OPERATING FLOW



1. Primary Reduction

Shredding

Shredder reduces whole tires into smaller pieces and drops shredded pieces onto the Taper Slot Screener (Action Classifier) which separates and returns large pieces back to the shredder and allows less than two inch pieces (nominal) to continue to the hopper feeder for storage.

Freezing

Liquid nitrogen is injected into the Freeze Chamber which advances the rubber chips along its length and cryogenically freezes the chips of rubber material making them very brittle.

Fragmentation

The frozen chips drop out of the Freeze Chamber into Hammer Mills which by way of steel hammers pulverize the frozen chips into millions of smaller pieces. This operation also allows for separation of the steel and fiber from the rubber.

Separation

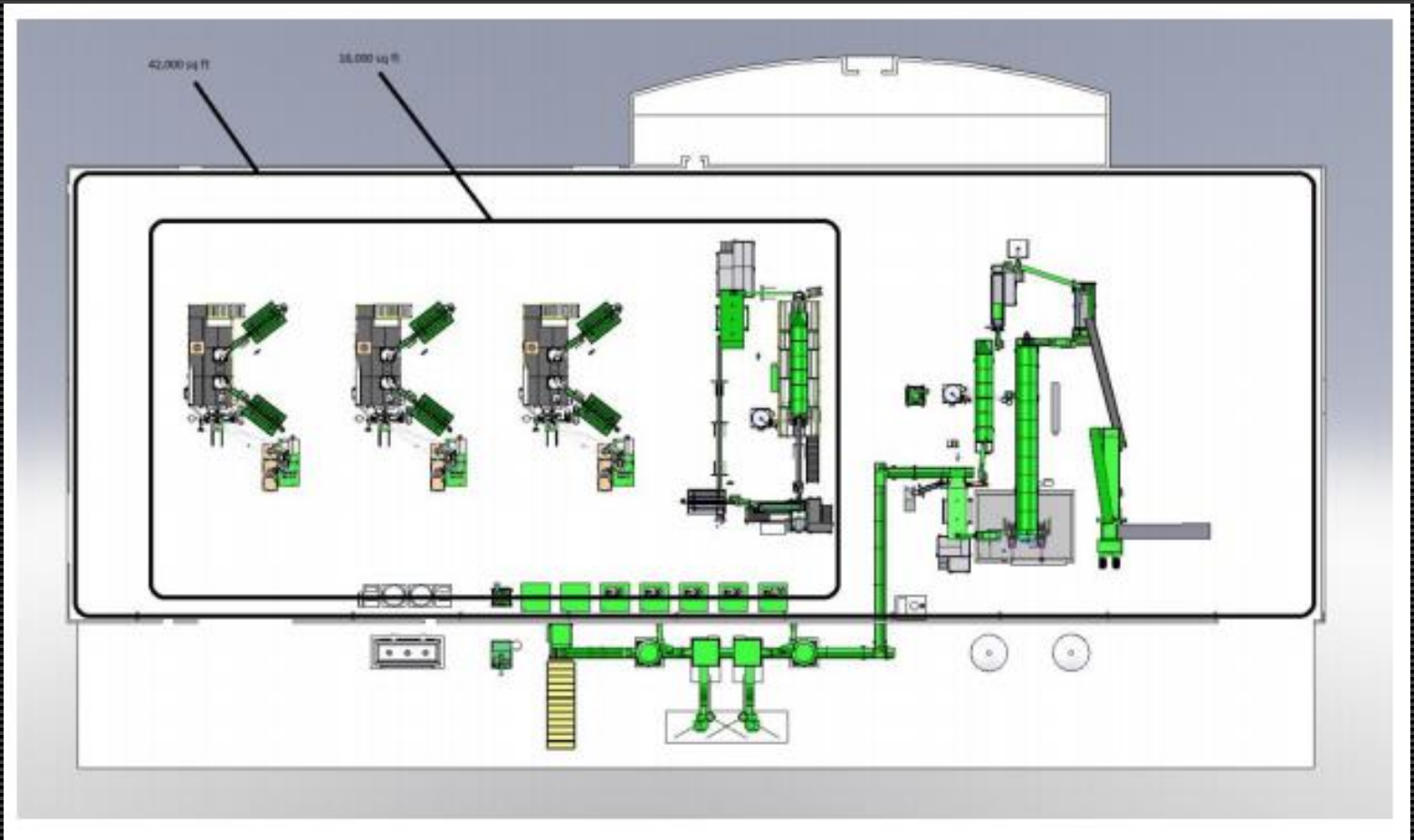
Primary Screener is used to separate the fiber from the steel and rubber. Fiber is removed to the Fiber Reduction System. The rubber and steel are passed over a Magnetic Belt Separator which separates the steel from the rubber.

The Drying Tunnel utilizes warm air to remove any excess moisture from the rubber. Fine airborne fiber is also removed through Dust Collection.

Rubber passes over a Double Drum Magnet Separator which removes fine steel remnants.

A Vibrating Screener fixed with perforated screen separates the larger rubber particles for return to the Freeze Tunnel.

Smaller size Crumb Rubber that passes through the Vibrating Screener then passes through a Four Deck Screener which separates the rubber according to size specifications.


42,000 sq ft
16,000 sq ft

Dust Collection

The Primary System from the Freeze Tunnel to Separation is equipped with a Dust Collection System which utilizes a vacuum to remove the dust created during the process. This Collection System removes the airborne fiber and used nitrogen gas from the system.

Primary Electrical

Controls for the Primary System including PLC and all electrical connections are contained in one Electrical Panel.

2. **Secondary** Reduction - **Fine Mesh**

Freezing

Liquid nitrogen is injected into a small Freeze Tunnel which advances the Rubber Crumb along and cryogenically freezes the rubber making it very brittle.

Fragmentation

Frozen crumb is passed through a hammer mill which utilizes steel hammers to pulverize and reduce the size of the crumb rubber.

Separation

Pulverized crumb rubber passes through a warm air dryer which removes any moisture from the crumb. Fine fiber is extracted through the Dust Collection System.

Dry crumb rubber passes across a Double Drum Magnet to remove any fine steel.

Steel free crumb rubber passes through a Two Deck Screener which separates large material for return to the Freeze Tunnel and allows fine material to go on for further processing

Dust Collection

The complete Secondary System from the Freeze Tunnel to Separation is equipped with a Dust Collection System which utilizes a vacuum to remove the dust created during the process. This Collection System removes the airborne fiber and used LN from the system.

Secondary Electrical

Controls for the Secondary System including PLC and all electrical connections are contained in one Electrical Panel.

3. TPE (Thermoplastic Elastomer)

Fine crumb rubber and ground recycled plastic is fed into a Twin Screw Extruder which utilizes heat to combine the two materials. Combined material passes through a Pelletizer which produces pellets. Pellets are then cooled and packaged.

Dust Collection

The complete Blending System from the Freeze Tunnel to Separation is equipped with a Dust Collection System which utilizes a vacuum to remove the dust created during the process. This Collection System removes the airborne fiber and used nitrogen gas from the system.

Blending Electrical

Controls for the Blending System including PLC and all electrical connections are contained in one Electrical Panel.

4. By-products Removal

Fiber is removed through the Fiber Reduction System to the Dust Collection System into a compactor for removal and disposal. All usable materials are returned to the Primary System for re-processing.

All expended nitrogen which is in a gaseous form is returned to the atmosphere as a non-pollutant.

Dust Collection System utilizing large filter houses and cyclone units removes dust, dirt and fine fiber from the product at various points in the system. Provides suction at the hammer mills to exhaust gaseous nitrogen, removes fiber from crumb rubber, and by creating an oxygen free atmosphere reduces the risk of fires in the hammermills. Dryer heat is also exhausted through Dust Collection System.

QUESTIONS & ANSWERS

1. **The factory building requirement and specifications (ceiling heights, power requirement, temperature requirement, Dock height, etc….)**

   Ceiling Height . . . it is 9M+.

   For the Electrical: it will amount to 2,800KW – with additional for HVAC.

   It is NOT Temperature Sensitive other than in Desert conditions: typically Interior Heat with Steel Buildings require some type of Fans/AC at the same time.

   Truck Docks should be at Regional Preferences: with Ramps for Loaders/Skids/Fork-Lifts/Pick-Ups/Delivery Trucks into Building Operations at 2/3 Units.

2. Time line from order date to delivery, installation, testing and training.

Enhanced Bio-Mass at $50MUSD for Turn-Key per GE/CAT/Siemens/Rolls Royce – which Includes the Training/Warranty ex-Factory/Delivery to Site Operations with Take-or-Pay ex-FCL Houston Offices.

Total: Six (6) Months from Initial Equipment Order-Up:

@$5MUSD per Deutsche Bank as Commercial Bank of Record which is followed-by:

- $10MUSD for Month #2,
- and then Followed By $15MUSD for Month #3,
- with Residual Funds of $20MUSD for Month #4/Final Month.

Shipment Costs and Insurance is Included (TBD).

Insurance to Owners

Set-Up for Turn-Key is typically at Thirty (30) Days.

Training is an Additional Ten (10) to Fifteen (15) Days – including Ramping of Operations prior to Leaving for Airport(s).

3. **Buyer information of production on the pay or take off agreement information. Is it FalconRoyce Capital ?**

Take-or-Pay via FCL Houston Offices et al: but International L/C to/for Buyer(s)/Owners @ In-Country-Basis