

ADDENDUM NUMBER 1

January 29, 2025

**PROJECT: MONTGOMERY AIRPORT TERMINAL IMPROVEMENTS
FOR THE MONTGOMERY AIRPORT AUTHORITY
MONTGOMERY, ALABAMA
GMC PROJECT NO. TMGM250001 | AATL230031**

AD1-1 GENERAL:

- A. The following revisions and/or additions to the Drawings and Project Manual are hereby made a part of same, and shall be incorporated in the Work of the Contract the same as if originally included in the Bid and Construction Documents.
- B. Bidders shall acknowledge receipt of this Addendum in writing, as provided on the Proposal Form.
- C. When a revision and/or addition is called for to the Drawings or Project Manual, they shall be fully coordinated with and carried through all applicable Drawings and portions of the Project Manual, including in part, all related Civil, Landscaping, Architectural, Structural, Plumbing, Mechanical, Electrical, and other Documents.

AD1-2 PROJECT MANUAL AND SPECIFICATIONS:

- A. Add Specification Section - 14540 BAGGAGE HANDLING SYSTEMS.

AD1-3 DRAWINGS:

- A. None.

AD1-4 MISCELLANEOUS:

- A. None.

END OF ADDENDUM NUMBER 1

Attachments: None.

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SECTION 14540

BAGGAGE HANDLING SYSTEMS

PART 1 - GENERAL PROVISIONS

1.1 MANUFACTURERS

- A. Manufacturer:
 - 1. Basis of Design: Equipment supplied by G & S Airport Conveyor System, 3409 West Harry St. Wichita, KS 67213 Contact: Tim Buffam Phone: (888)328-8826, or pre-approved equivalent Manufacturers/Installers.
- B. Equivalent Manufacturers/Installers: Acceptance of additional suppliers, manufacturers, and/or installers are encouraged and shall be limited to those suppliers properly submitted for approval at least 7-days prior to the Bid Date and subsequently accepted in writing by the Architect. Suppliers shall provide proof of similar history, project experience (in last 5 years), and references related to the scope of this projects similar related work. Suppliers shall be at least **5** years in service and installation to Airport Baggage Handling Systems to be considered for equivalent Manufacturer/Installers acceptance.

1.2 DESCRIPTION

- A. The work entailed in this section is the furnishing and installation of (number of systems) check in conveyor, (number of systems) general transport conveyor, and related equipment as noted herein. The work entails, without limitation, the design, manufacture, installation, and commissioning of the conveyors, including roll up doors (if applicable), and the complete electrical wiring and control systems.
 - 1. Check In Conveyors
 - 2. General Transport Conveyors
 - 3. Inclined Plate Sortation Devices (Slope Plate Conveyors)
 - 4. Flat Plate Conveyor (Pallet Loop Conveyors)
 - 5. Security / Fire Doors & Draft Curtains

1.3 REQUIREMENTS

- A. American Welding Society Standards
 - 1. AWS-A2.0 Standard Welding Symbols
 - 2. AWS-C1.1 Recommended Practice for Resistance Welding
 - 3. AWS-D1.0 Standard Welding Practice in Building Construction
- B. American Gear Manufacturers Association Standards
 - 1. 460.04 Practice for Gear Motors
 - 2. 461.01 Practice for Worn Gear Motors

- C. American National Standards Institute
 - 1. A-12.1 Safety Code for Floor and Wall Openings, Railings, and Toe Boards
 - 2. B-20.1 Safety Code for Conveyors, Cableways and Related Equipment
 - 3. B-29.0 Transmission, Roller Chains, and Sprocket Teeth
 - 4. B-105.1 Specifications for Welding Steel Conveyor Pulleys
 - 5. B-33.1 Safety Standards for Flexible Cord and Fixture Wire
 - 6. A-53.1 Safety Color Code

- D. National Bureau of Standards
 - 1. Handbook H28, Screw Thread Standards

- E. National Fire Protection Association
 - 1. NFPA National Electrical Code

- F. National Electrical Manufacturers Associations Standards
 - 1. IC-S Industrial Controls and Systems
 - 2. MG-1 Motors and Gear Motors

- G. Air Transport Association
 - 1. ATA Specification # 101, Specification for Ground Equipment Technical Data.

- H. Safety
 - 1. Current standard: All equipment and installation shall conform to the current standards and interpretations of the Williams- Steiger Occupational Health and Safety Act (OHSA) of 1970, Public Law 91-596, and ANSI Standards Number B20.1-1990.
 - 2. Switches: Motors will be provided with safety disconnect switches to permit shutting off the motor power circuits. Switches will be equipped with a “locking out” feature in the off position.
 - 3. Additional Features: The following additional safety features will be incorporated into the system:
 - 4. Control methods, circuitry, mechanical equipment, and operating procedures shall consider the safety of the public and operation and maintenance personnel. System design will minimize possible damage to equipment and baggage being handled. If a conflict should arise between safety to people or equipment, safety to people will take precedence.
 - 5. Whenever an unsafe condition could develop from an equipment failure, or a procedural error, fail-safe techniques will be used to prevent the occurrence of the unsafe conditions.
 - 6. Public unattended control stations will be protected to prevent operation by unauthorized persons.
 - 7. System operation controls shall be convenient, clearly identified, simple, and safe to use. Possible errors shall be minimized. Emergency stops will be provided.

- I. General Practices / Workmanship

1. All work shall be conducted in a professional manner and shall include (but not limited to) these practices:
2. Work site shall be kept clean and free of any debris which may cause a work hazard or is otherwise unsightly - garbage & crates must be removed and disposed of at the direction of the supervising engineer.
3. All products shall be free of burrs and sharp edges.
4. All metal parts requiring site fit must be primed and painted to match adjacent conveyor.
5. All welds must be thoroughly cleaned and wire brushed prior to priming & painting.

1.4 WARRANTY

- A. The scope and interval of the contractor's warranty will be explicitly concurrent with the design proposal. Component or subassembly warranties not assumed by the seller must run to owner from the manufacturer and be explicitly stated. As a minimum, the equipment will have a one (1) year warranty on parts only, beginning with in-service date or date of substantial completion of contract. This date will be determined at time of installation and will generally be considered the date that the system is turned over to the owner for use.
- B. Owner will have the option of performing any repairs necessary to maintain the unit(s) in a serviceable condition during the warranty period, notifying the manufacturer first before proceeding with the work. It shall be the responsibility of the owner to maintain accurate maintenance records for warranty purposes.

1.5 SUBMITTALS

- A. Upon notice to proceed, the contractor shall furnish within 21 days, four (4) complete material data submittal binders. The owner will endeavour to transmit electronically to the contractor accurate and up to date drawings of the facility in AutoCAD dwg format (R14 or later) as soon as possible to assist the contractor in the timely completion of the submittal process. Submittals must include all pertinent information describing the baggage conveyor manufactures proposed layout, component selection, details of material composition, electrical drawings, mechanical drawings, and cut sheets detailing all of the contractors proposed selection of drive components, belting types, door manufactures, etc. Drawings include at a minimum: mechanical layouts; plan views, elevation views, and cross sections of the baggage handling equipment in relationship to the building; electrical control cabinet; field device locations; and electrical wiring diagrams.
- B. Submittal Format: Submittals should be laid out in the following five sections:
 1. Introduction & Warranty Information
 2. Detailed Systems Descriptions
 3. Mechanical Drawings
 4. Electrical Drawings
 5. Ancillary Information & Product Data Sheets
- C. Samples: Submit samples of materials and finishes for each type of device in accordance with contract documents. Samples must be provided in the same number as number of submittals.

- D. Certification: Approval of material and equipment will be based on manufacturer's published data, where material or equipment are specified to be constructed and/or tested in accordance with the standards of the American Society of Mechanical Engineers, the National Electrical Manufacturer's Association, or the Underwriters' Laboratories, Inc. Contractor will submit proof that the items furnished under this specification conform to these requirements, if requested by the Engineer.

1.6 PROVISIONS FOR MAINTENANCE

- A. The system will be designed so that those parts which require periodic replacement or adjustment will be easily accessible and can be serviced in a minimum amount of time.
- B. If the building design hinders the layout of the conveyor for maintenance purposes, it is the responsibility of the contractor to notify the owner during the submittal and/or installation phase of the project that conflicts are foreseen so that a resolution can be found to any issues raised.

Items requiring consultation may include (but are not limited to):

1. Interferences with baggage height requirements
2. Interferences with maintenance access to moving components
3. Interferences of the baggage system into walkways, etc.
4. Any part of system which might pose a threat to the health and safety of airline employees or the travelling public.

1.7 PERFORMANCE TEST

- A. After the installation of the system is complete, its operating capability will be demonstrated. All "debugging" will be completed prior to the start of the systems testing. It is expected that all systems will be run for a minimum of 24 hours in a "no load" condition prior to any systems being tested. The performance test will be conducted in the presence of the owner and/or representative to a maximum of eight (8) hours. The requirement for systems testing will remain at the discretion of the supervising engineer.
- B. The performance test will include:
1. Checking the operational and safety devices of the system using bags, totes, or boxes.
 2. Demonstrating the capability to handle the required sizes and weights of baggage through the system without jamming or excessive toppling of baggage.
 3. Demonstrating the capability of all conveyors to start under full load.
 4. Measuring all conveyor speeds using a standard device. These measurements will be taken with the system in a "no load" condition, i.e. all conveyors running without baggage. Any component not operating within eight (8) percent of design speed will be reworked to bring it to proper speed.
 5. Measuring the amperage draw of all conveyors in the "no load" condition - any conveyors running within ten (10) percent of recommended amperage must be re-sized to the next size up. (i.e., 1 H.P. to a 1 ½ H.P.)
 6. Taking temperature readings of motor / gearbox components to insure that they are not out of manufactures specs.

7. Ensuring all belts track correctly.
 8. Ensuring all electrical functions / control stations / emergency stops function correctly.
- C. Correction of Unsatisfactory Operation
- 1.7.1 During the test period, any deficiencies or variations in the design, fabrication, or operation causing unsatisfactory performance will be corrected to provide satisfactory performance. Manufacturer must have appropriate service personnel on site during the test period to service or adjust the systems equipment as required.
- D. Test Program
1. A test program for compliance with the above demonstration requirements will be submitted for review and approval prior to operations start-up date for the systems.
- E. Failure Defined
1. A failure during any test period will be defined as any design characteristic or malfunction or the furnished equipment or materials that damage baggage or reduce any operating rate below those specified. Conditions resulting from improper loading of baggage or loading baggage of sizes not included in the specification requirements will not be considered as failures.

1.8 ACCEPTANCE

- A. After completion of the system performance tests, an acceptance inspection will be made by the customer's representative and a representative of the manufacturer. The purpose of this inspection will be to determine that the conveyor system has been furnished and installed as specified. If the system is non acceptable for reasons of non-compliance to the drawings and specifications, the owner will receive immediate corrective action within the construction schedule. A final acceptance inspection will be done to determine if all corrections have been made.
- B. Even though the equipment will be inspected and accepted for warranty purposes, the acceptance date will not occur before all contractual obligations are completed. This includes the delivery of all "as built" drawings, maintenance, operations and spare parts manuals, and ensuring all punch list items have been completed.
- C. A system acceptance form will be executed by the owner and contractor at conclusion of this acceptance.

1.9 OPERATION & MAINTENANCE MANUALS

- A. Three (3) Operation and Maintenance manuals will be provided. Manuals will be presented to the owner prior to the date of the start of the pre-acceptance testing period & prior to any maintenance training on the systems installed. The manuals will be updated by supplement to reflect any field changes or equipment changes due to warranty, etc., that are made during the warranty period of the system so that the manuals will reflect "as built" information.

- B. The Operations & Maintenance manuals will be organized as follows:
1. Section One – Introduction and Warranty
 2. Section Two – Safety
 3. Section Three - System Description (for each system)
Details to include: belting types & lengths, drive types & horsepower's, support types, conveyor finishes, etc.
 4. Section Four - Mechanical Drawings (“as built”)
 5. Section Five - Electrical Drawings (“as built”)
 6. Section Six - Conveyor Equipment- equipment overview, maintenance instructions, and maintenance check lists.
 7. Section Seven - Bill of Materials - (including all electrical & mechanical components)
 8. Section Eight - Ancillary Equipment Information - (manufacturers printed maintenance materials for all ancillary equipment)
 9. Section Nine - Recommended Spare Parts Listing
The spare parts list must be tailored to specific requirements of the project. Long lead time items must be highlighted and bold faced, prices must be included for all recommended spare parts
 10. Section Ten - Order Forms

1.10 OPERATIONS & MAINTENANCE TRAINING

- A. General Requirements
1. The baggage conveyor manufacturer must provide to the owner at no additional cost, complete maintenance, and operational training at the conclusion of the installation phase.
 2. Training must be conducted while the system is operational and as close as possible to the system start-up date.
 3. Training must be conducted in person and be done by a knowledgeable person who has extensive experience with the equipment and who will be able to answer any questions which may arise during the training.
 4. Maintenance training will be conducted for a period up to 8 hours in duration. Maintenance training must include: O & M manual, review and schedule preventive maintenance programs, troubleshooting instruction, and question and answer session. At the owners request this training may also include component removal and replacement demonstration. Maintenance should be hands on and should utilize the working equipment as a teaching aid.
 5. Operation training will be conducted in up to 4 classes of ½ to ¾ hour duration. The contractor / trainer must be available at odd hours so that workers on odd shifts can be accommodated.
 6. Record of persons trained (operations & maintenance) will be forwarded to the owner with the “as built” drawings at the conclusion of the project.

1.11 AS BUILT DRAWINGS

- A. At the conclusion of the contract work, the customer will be provided with three copies of “as built” drawings.

1.12 INCONSISTENCIES

- A. The manufacturer will be responsible for notifying the customer for resolution of any inconsistencies in the contract documents.

1.13 CONSTRUCTION SCHEDULE

- A. The work will be started and completed in the time shown on the construction schedule and/or as directed.

1.14 BUILDING CODES

- A. All equipment and installation will comply with the current National Electric Codes, NEMA standards, and all applicable local, building, and safety codes.

PART 2 - DESIGN SPECIFICATIONS

2.1 LUGGAGE SIZE

- A. The system is designed to handle baggage sizes as follows:

Normal: Items which can be processed by the equipment without special handling.

1. Oversized items such as animal cages, map cases, golf bags, duffel bags, etc. which cannot be handled by the equipment and must be manually transported. Skis, golf bags, and duffel bags with maximum dimensions of 54 inches in length by 18 inches in height and weighing up to 70 pounds can be processed as normal baggage.
2. Fragile/Odd Size; Items such as garment bags, hat boxes, bowling balls, shopping bags, etc., which when in tote trays can be process as normal baggage.
3. The following defines the physical characteristics of normal baggage and is to be used in the design of the new system:

Parameter	Maximum	Minimum
Length	36" (1100mm)	12" (305mm)
Width	24" (610mm)	3" (75mm)
Height	30" (770mm)	3 (75mm)
Weight	100# (45kg)	5 # (2.25 kg)

Note: For testing purposes the average bag length is to be 30".

2.2 LIVE LOAD

- A. All load conveyors will be designed to support and move a minimum live load of 40 pounds per

lineal foot, with a maximum load of 100 pounds per bag. All conveyors will be capable of starting under full load conditions.

2.3 CLEARANCES

- A. A minimum of 36" clearance from the conveying surface to the underside of any building members or utilities will be maintained. If any building condition causes an inability to maintain this clearance - the owner / owner's representative should be notified as soon as possible.
- B. The baggage system will be designed to perform, including required clearances, in a baggage room with a net vertical clearance dimension of 8'-0".

2.4 FRictionAL COEFFICIENT

- A. A minimum frictional coefficient of 0.25 will be used for the purposes of calculating horsepower requirements.

2.5 SERVICE

- A. All equipment provided under this contract will be heavy-duty and has been designed for a service requirement of 18 hours per day, 365 days per year continuous service. All gear reducers will be selected for AGMA class II operation.

2.6 VIBRATION LIMITS

- A. All equipment provided under this contract will not produce or induce any vibrations into the building that will be injurious to the system or structure. Equipment supported from the building structure should be mounted with vibration isolators.

2.7 SWAY BRACING

- A. All hanging conveyor shall be sway braced a minimum of every twenty (20) feet - if more bracing than this is required to provide a rigid installation it will also be the contractor's responsibility. Satisfactory rigidity will be at the discretion of the supervising engineer.

2.8 NOISE LIMITS

- A. The equipment provided under this contract will not emit ambient noise levels exceeding 50 dB in public areas, 60 dB in non public areas nor will the equipment increase the ambient noise levels more than 15 dB.
- B. In no case will total noise levels exceed 70 dB above the frequency of 4000 cycles per second or below 100 cycles per second.
- C. Testing will be conducted as follows:
 - 1. The baggage handling system equipment will be turned off.
 - 2. All other equipment (i.e., air conditioning and heating equipment) will be on and

outside noise sources will be normal (aircraft and mobile ground equipment operating).

3. Noise level readings will be taken throughout a zone five feet above the floor using a standard ASA sound level meter set to the “A” weighted scale.
4. After the ambient noise level has been determined by steps a, b, & c - the baggage handling system equipment will be turned on and the total noise level will be measured at the same points through out the zone that the ambient levels were measured.

2.9 COMPATIBILITY & VERSATILITY

- A. With a focus on increased equipment standardization and reducing maintenance resource requirements the following will be undertaken:
- B. All conveyor components will be standardized as much as possible, providing maximum interchangeability of components and thereby reducing the number of spare parts required.
- C. The design, construction, and installation of all conveying equipment will provide maximum accessibility and convenience for all maintenance and operating requirements. (See section 1.06 above)
- D. The equipment will provide maximum accessibility for the repair or replacement of parts, or assemblies in lieu of parts, or other removable and replaceable equipment items without having to move, remove, or dismantle associated equipment, other equipment, or structural items in the area.
- E. Lubrication fittings and electrical controls will be located wherever possible with maximum access as a prime objective. In areas where there are catwalks; drives, disconnect switches, jam detectors, etc., will be mounted so that they are accessible from the catwalk.
- F. Guards, covers, etc., will be equipped with quick removal fasteners or hinges with pull pins in areas where jams may occur or maintenance access is limited.

2.10 RADIO INTERFERENCE

- A. The equipment provided will not cause interference with communications within the airport and aircraft or ground vehicles.
- B. All electrical and electronic equipment, including inter-connecting wires and cables are designed to operate without interference in the presence of normal electromagnetic emissions generated by other equipment installed or used at the airport. The normal airport environments include various electrical motors and controls, power tools (including welders), automotive vehicles, etc.

PART 3 - MECHANICAL SPECIFICATIONS

3.1 GENERAL

- A. Structural plates conform to ASTM A-36. Hot rolled sheets and coils conform to ASTM A-569. Structural steel shapes conform to ASTM A-36.
- B. All welding electrodes will conform to AWS A-5. 18-69. The standard code for arc and gas welding in building construction will be used as a guide to general procedure and qualification of welders.
- C. Fasteners conform to ASTM A-307 Class 2A thread fit for bolts, and Class 2B thread for nuts. All fasteners are plated. All fasteners will be locked with ny-locks or lock washers.
- D. Steel used in the fabrication of the equipment is new, clean and free from rust, rust pits, kinks, and sharp bends. The forming processes will not fracture or otherwise damage the metal. Burrs, sharp edges, and sharp corners will be removed. All parts are formed and cut properly to assure uniformity. All joints will be smooth and all corners rounded. Holes for photocell beams will be punched and free of any sharp edges of burrs.
- E. Unguarded, exposed sharp corners and edges of items; such as, but not limited to support legs, braces, and trim will be well rounded or removed to prevent injury to employees or damage to clothing.

3.2 BELTING

- A. Specification for belting used on all horizontal conveyors in public view: (manufactured by Habasit Globe USA / Forbo Siegling / Ammeraal Beltech/ or approved equal)
 - Overall thickness: 5/32" (2 ply)
 - Color: black
 - Covers: 1/32" x bare surface
 - Carcass: Polyester
 - Workload: 150 pounds per inch of width
 - Ultimate tensile: 1500 pounds per inch of width
- B. Specification for belting used on all horizontal conveyors not in public view: (manufactured by Habasit Globe USA / Forbo Siegling / Ammeraal Beltech/ or approved equal)
 - Overall thickness: 9/64" (2 ply)
 - Color: black
 - Covers: bare x bare surface
 - Carcass: Polyester
 - Workload: 150 pounds per inch of width
 - Ultimate tensile: 1500 pounds per inch of width
- C. Specification for belting used on all incline and decline conveyors over 8 degrees: (manufactured by Habasit Globe USA / Forbo Siegling / Ammeraal Beltech/ or approved equal)

Overall thickness: 9/32"
Color: black
Covers: rough top x bare surface
Carcass: Polyester
Workload: 150 pounds per inch of width
Ultimate tensile: 1500 pounds per inch of width

- D. Specification for belting used on all merge conveyors: (manufactured by Habasit Globe USA / Forbo Siegling / Ammeraal Beltech/ or approved equal)

Overall thickness: .090"
Color: Black
Covers: PVC
Carcass: 50/50 cotton- polyester
Workload: 85.6 pounds per inch of width
Ultimate tensile: 850 pounds per inch of width

- E. Belt lacing will be sized based on belt thickness, width and load requirements and will be manufactured by Clipper or Anchor.

3.3 CONVEYOR BEDS

- A. The conveyor frame will be capable of supporting a static, uniformly distributed load of 25 pounds per square foot without excessive deflection which would be detrimental to the frame structure. Frame support legs will be on 8-foot centers except in loading and unloading areas where 5' support intervals will be used.
- B. Conveyor framework will be made of steel. The slider bed will be a minimum of 12-gauge steel and will provide a smooth, level surface.
- C. Slider bed panels will be of 12 gauge material broke in the form of a channel. This channel form will have closed ends and will be cross braced with 1-1/2" x 1-1/2" x 3/16" angle iron on 32" centers for all sections of conveyor.
- D. The bed sections on stainless steel trimmed conveyors will not have an elevation difference between the slider bed surface and the stainless trim.
- E. Conveyor beds within tunnel areas will be supported to a top of belt height of 24" above the floor.

3.4 SIDE GUARDS AND SHROUDING

- A. Vertical side guards for conveyors not in public view will be 12 gauge hot rolled mild steel (HRMS) extending vertically 21" above the bed and will incorporate 1- 1/4" x 1-1/4" x 3/16" angle iron stiffeners on 32" centers for all conveyor sections. Side guards in public view will be formed 14 gauge stainless steel, type 304 #4 brush and will be 18" high. Stainless steel guards will be supported on 5' centers, and will be present on both sides of the slide bed unless at a loading or unloading section where one high side and one low side will be used. All joints will be aligned for snag free operation.

- B. The distance between side guards will be 3" greater than the belt width. Side guard joints are bolted and will provide a continuous, uninterrupted surface for the entire length and height of the joints.
- C. The side guards of power turns will not be welded to adjacent straight conveyor side guards. No mechanical or electrical equipment will be mounted on the outside radius side guard of Portec curves or the either radius side guard of Transnorm curves.
- D. Shrouding will be provided for conveyor equipment located in public areas. The shrouding will be formed stainless steel, 12 gauge, type 304 with horizontal #4 brushed finish. All connections will be smooth and flush without openings or projections on which bag tags, straps, etc., may catch. HRS shrouding and or bearing caps will be provided on unload conveyors to meet OSHA requirements.

3.5 FINISHES

- A. The belt side of the slider bed will be unpainted. All conveyor components, structure members and structural supports will under go a chemical wash followed by a powder coating process. The resultant color will be ASA 70 Grey.
- B. All surfaces which are to be painted will be thoroughly cleaned of rust, scale, oil, grease, grit, welding slag, and all other forms of dirt detrimental to good painting practices. After installation, all scuffed or otherwise marred surfaces will be cleaned and a touch-up coating of paint applied.
- C. All flat head screws used to attach the stainless steel shrouding, such as the horizontal portions attached to the conveyor bed, will be completely countersunk so that no portion of the screw head is above the adjacent surface. Grinding or filing of the screw heads is not acceptable.
- D. Site welding of stainless steel should be avoided if at all possible. The contractor may elect to site weld stainless upon approval by the site engineer. Any field welding done to stainless steel trim will be done in the same manner and with the same procedures as in the manufacturing plant. This includes all polishing procedures and techniques. Blemishes of the stainless steel trim elements will not be accepted, including those caused by poor manufacturing or field practices.
- E. Claim Units (pallet loop or sloped plate conveyors) in public areas are to be trimmed in 12 gauge stainless steel.
- F. Claim Units (pallet loop or sloped plate conveyors) in baggage make up areas are to be trimmed in 12 gauge galvanized steel.
- G. Structural members of claim units are to be primed and painted with at good quality primer & paint in the contractor's standard color.

3.6 SUPPORTS

- A. All hanger type supports will be adjustable and of 3/4" diameter threaded rod. Cross sills will be properly sized angle, channel, or pipe. Hangers will be adequately sway braced laterally

and/or longitudinally as required to provide a rigid installation. Maximum hanger support centers will not exceed 10'. Overhead conveyors will be supported from building structural steel or by using expandable type anchors in concrete ceilings. Vibration isolators must be used where conveyor is supported from the building structure.

- B. Floor supports will be adjustable and formed of a minimum 12 gauge steel. Supports at load and unload conveyors will be placed at a maximum of 5' centers, and a maximum of 10' centers on all transport conveyors. Floor supports should HRMS with a powder coat finished.

3.7 HEAD AND TAIL PULLEYS

A. Head Pulley:

1. All head pulleys are manufactured from schedule 40 piping. Each pipe has its ends internally bored to receive side plates. These side plates are made from 3/8" mild steel plating and are laser cut to exacting sizes and are then drilled to receive four bolt flange bearings. They are then fitted into the roller and continuously welded. The final process involves machining a 1/8" per foot trapezoid crown into the face of the pulley to enhance tracking efforts. This final machining also removes any of the roller's radial runout.
2. All rollers are mounted on 1045 ground & polished shafting of 1 1/2" diameter. Rollers are prevented from axial movement along the shaft with the use of circlips. Bearing creep is eliminated with the use of eccentric collars or setscrews.
3. Pulleys will be of 6" diameter with a 1/4" wall, except at the end of crowned sections.
4. Slider beds will be positioned to keep the gap between the end section and the pulley end to a minimum. The gap between adjacent end pulleys will not exceed 1", with 1/2" being the design objective.
5. All head pulleys will be equipped with plated jacking bolts to provide a total combined adjustment of 1 1/2" per conveyor minimum. Jacking bolts will be equipped with jam nuts.

B. Tail Pulley:

1. All head pulleys are manufactured from schedule 40 piping. Each pipe has its ends internally bored to receive side plates. These side plates are made from 3/8" mild steel plating and are laser cut to exacting sizes and are then drilled to receive four bolt flange bearings. They are then fitted into the roller and continuously welded. The final process involves machining a 1/8" per foot trapezoid crown into the face of the pulley to enhance tracking efforts. This final machining also removes any of the roller's radial runout.
2. All rollers are mounted on 1045 ground & polished shafting of a minimum diameter of 1 1/2". Bearing creep is eliminated with the use of eccentric collars or setscrews.
3. Pulleys will be of 6" diameter with a 1/4" wall, except at the end of crowned sections.
4. Slider beds will be positioned to keep the gap between the end section and the pulley

end to a minimum. The gap between adjacent end pulleys will not exceed 1", with ½" being the design objective

5. All tail pulleys will be equipped with jacking bolts to provide a minimum total combined adjustment of 1 ½" per conveyor. All jacking bolts will be equipped with jam nuts.
6. Tail pulleys enclosure design will allow the tail pulley to be easily removed from either side or out the bottom by simply removing a flank plate.

3.8 POWER PULLEYS * see section 3.14

3.9 TAKE UP AND SNUB PULLEYS

- A. All take-up pulleys are manufactured from 6" diameter schedule 40 piping. Each pipe has its ends internally bored to receive side plates. These side plates are made from 3/8" mild steel plating and are laser cut to exacting sizes and are then drilled to receive four bolt flange bearings. They are then fitted into the roller and continuously welded. The final process involves machining straight machining the face to remove run out.
- B. Take up rollers are mounted on 1045 ground & polished shafting of 1 ½" diameter. Rollers are prevented from axial movement along the shaft with the use of circlips. Bearing creep is eliminated with eccentric collars or setscrews.
- C. Take Up pulleys are to be mounted on threaded take-up devices with a minimum of 6" adjustment in either direction. Adjustments to belt tension must be possible from either side of the conveyor (adjuster rods are joined via sprocket and chain to both sides of the conveyor).
- D. All snub pulleys are manufactured from schedule 40 piping. Each pipe has its ends internally bored to receive side plates. These side plates are made from 3/8" mild steel plating and are laser cut to exacting sizes and are then drilled to receive four bolt flange bearings. They are then fitted into the roller and continuously welded. The final process involves machining the face of the pulley to remove any radial runout.
- E. All snub pulleys will be equipped with plated jacking bolts to provide a total combined adjustment of 1 ½" per conveyor minimum. Jacking bolts will be equipped with jam nuts.

3.10 BELT RETURN ROLLERS

- A. Return rollers will be a minimum of 2 ½" diameter, 11 gauge steel equipped with an 11/16" hex shaft axle. Support bearings are sealed permanently lubricated precision ball bearings. Location of rollers will be on 8' centers and may be reduced in areas which require it.

3.11 VERTICAL BENDS (KNUCKLES)

- A. Vertical bends will be of the curved slider bed design and fabricated from a minimum of 12 gauge steel. Minimum belt radius will be five feet. Each bend will be equipped with a 4" diameter snub pulley mounted on precision 2 bolt flange bearing (bearings as per bearing spec.). The maximum acceptable bend will be 22 degrees with 18 being a design objective.

3.12 POWER TURNS

- A. All powered turns will be manufactured by either Transnorm or Portec. Unless otherwise noted, “B” radius curves will be used at ticket counters, and “C” radius elsewhere. The belt speed as measured on the center line of the belt width will match the speeds of adjacent conveyors or progressively increased to meet bag travel time requirements. Side guards for turns will be in alignment with the adjacent straight conveyor side guards. The angle iron frame supporting the outside guard will be fabricated in two sections on turns greater than 90 degrees for quick removal for repairs and maintenance. Belting and drive components for power turns will be supplied by the curve manufacture.
- B. Drive motors will be “C” face units mounted to shaft mount reducers. Motor/gearbox units supplied by SEW Eurodrive (S or K Series) or by Dodge (Combination Tigear)

3.13 BEARINGS

- A. All bearings will be greaseable, self-aligning, anti-friction, ball bearing type, pre-lubricated and sealed with synthetic lip seals. All bearings will be provided with lubrication fittings.
- B. Bearings will have a minimum B-10 life of 30,000 hours based on service and loading of conveyors, and on the manufacturer’s published data showing the load rating of each bearing. Calculation to be furnished upon request.
- C. All bearings will be Dodge, Link Belt, or Fafnir.

3.14 CONVEYOR DRIVES

- A. Drive unit pulley enclosure design will allow the drive unit pulleys to be easily removed from either side or out the bottom by simply removing a flank plate. All conveyors will be powered using motorized pulleys or integral gearbox / motor combination drives (drives must be “close coupled” or “C” faced without need of belts/ chains/ etc.) Motorized pulleys may be manufactured by Van der Graaf, Joke (Interroll) or approved equivalent. Gear & motor drives may be supplied by SEW Eurodrive (S or K series) or by Dodge (Combination Tigear) or engineer approved equal.
- B. Drive Unit frame is manufactured in a separate modular form. It consists of four rollers; motorized pulley or drive roller, head, snub and take-up. The design allows each of these rollers to be easily removed from either side by simply removing a flank plate.
- C. All power pulleys will be lagged with a minimum 1/4" thick vulcanized lagging of 50 to 60 durometer and will have a crowned face. Minimum belt wrap on drive pulleys will be 210 degrees. Drive pulley diameters and shaft sizes are determined as follows:
 - 1. Light Duty (300 pounds maximum belt pull) consists of a 6-3/4" minimum diameter drive pulley with 1-7/16" minimum diameter shaft. Where used, a roller chain will be RC-60.

2. Normal Duty (750 pound maximum belt pull) - consist of an 8 ½" minimum drum diameter with a 1-11/16" minimum shaft diameter. Minimum roller chain used will be RC 60.
3. Intermediate Duty (1000 pound maximum belt pull) - consist of an 10 ¾" minimum drum diameter with a 1-15/16" minimum shaft diameter. Minimum roller chain used will be RC 60.
4. Heavy Duty (1250 pound maximum belt pull) - consist of a 12 ½" minimum drum diameter with a 2-3/16" minimum shaft diameter. Minimum roller chain used will be RC 80.
5. End drives: Power pulleys for end type drives or power take-offs will be lagged with a minimum 3/8" thick vulcanized lagging 50 to 60 durometer, and be 6" diameter, crown faced, and equipped with compression type hubs with 1-7/16" minimum diameter CRS shafts mounted in precision ground flange type ball bearings. End type drive units will not be used on conveyors exceeding 25' in length. Positive tracking pulleys may be used on conveyor lengths less than 5'.

3.15 CONVEYOR EQUIPMENT IDENTIFICATION

- A. Each conveyor section installed will be permanently marked with its perspective number shown on the approval drawings. Each conveyor number will be neatly painted or stenciled with letters 4" in height in a contrasting color, conspicuously located near the conveyor drive. Temporary markings on the conveyors or other equipment will be made with a medium which is readily removable without refinishing of the surface on which they appear.

3.16 BELT PROTECTION / ENCLOSURES / SAFETY GUARDING

- A. Mild steel protection guards will be provided and installed under all conveyors at points where conveyors incline or decline from 24" above finished floor to a point of 7' 6" above the finished floor and should be shown on the approved drawings. The guards will be constructed of flattened, expanded metal grating and attached with a minimum number of fasteners required to make them easily removable. Material type used will be in accordance with local codes and painted to match adjacent conveyor finishes.
- B. Guarding will be provided for drive chains or V-belts. Such guarding will be of a two piece construction fabricated out of a minimum of 14 gauge sheet metal, designed for chain or V-belt inspection without requiring the removal of the guard (i.e., expanded metal screen). Design of the guarding and of the two sections will provide for easy removal and replacement.

3.17 PLOW / MERGE CONVEYORS

- A. The merge unit will consist of a level belt conveyor with a deflecting guard positioned to funnel the discharge from the secondary feed conveyor onto another conveyor.
- B. The deflecting guard will be installed to provide a tapered gap between the bottom edge of the guard in relationship to the merge unit conveyor belt surface. This gap should be no greater than ¾" at the charge end and 1-¼" at the discharge end of the merge unit.
- C. The deflecting guard will be non-powered. The maximum deflection guard angle will be 15 degrees from the center line of the conveyor or sort device onto which baggage is merged. The

deflecting guard will be removable within a minimum amount of time in case of a jam.

- D. The deflector guard will be well braced so it cannot be deformed by normal forces placed against it during the baggage merge function.
- E. Face of deflector wall shall be polished metal of mild steel or covered with UHMWPE sheet stock of minimum 1/4" thickness fastened with countersunk screws.

3.18 DRAFT CURTAINS / DOOR OPENINGS

- A. Draft curtains will be provided at conveyor wall penetrations as indicated on drawings and will be flexible strip doors incorporating 8" x 1/16" black strips. Manufactured by Necor. Unless otherwise indicated a draft curtain must be provided at every opening where the conveyor passes through a wall into or out of a public space.
- B. The BHS contractor is responsible for providing a stainless steel trim to cover any exposed fasteners on the draft curtain.
- C. Door enclosures (i.e. the enclosure of the aperture through which the conveyor passes) will be the responsibility of the general contractor as part of his door schedule. Where the conveyor passes into or out of a public area, the public face of the wall will be a stainless steel door jamb. This will be the responsibility of the general contractor.

3.19 SPILL PLATES

- A. All conveyors feeding an incline plate device will be equipped with a spill plate to aid in baggage transfer. This plate will be constructed of a minimum of 12 gauge HRS (12 gauge stainless steel in public areas) and will be securely bolted to the discharge end of the belt conveyor. The width of the spill plate will be equal to the overall frame dimension of its respective conveyor. All welds, projections, corners, etc., will be smooth and well rounded to eliminate bag damage potential. The spill plate will be vertically adjustable, mounted 1/2" above the inclined plate device surface, and formed to the same slope angle as the flite surface.

3.20 INCLINED PLATE SORTATION DEVICE (SLOPE PLATE)

- A. General:
 - 1. Inclined plate devices will be constructed of articulating contoured flights forming a continuous, rotating, sloped surface. They will be arranged to receive baggage from a feed conveyor at a point on the inside rim, as indicated on drawings. The unit will be automatically fed via belt conveyor and will be operated continuously at 90 feet per minute. Minimum overall width of the conveyor surface is 56 inches. The unit's elevation will be such that the top surface of the outer trim will be 18" above the floor level.
 - 2. Metal components, chassis, and paneling are all cut and pressed on precision CNC controlled machinery, then welded or sub-assembled in accurate jigs. During fabrication, processes used to form and fuse these metals do not stress fracture or damage the metals. All sharp edges, corners or burrs are removed or rounded prior to the coatings stage. Design Data

B. Design Data:

1. The frame and track will consist of modular assemblies bolted together to form a support structure and guide for the flight assemblies. The track will be rolled or formed structural steel. Structural supports for the track are spaced on a maximum of 4 foot centers.
2. Drive for the sloped plate conveyor will be of a “caterpillar” type drive mechanism. Unit will be driven by a single chain: double strand ANSI 120 standard with drive rollers spaced at 24"O.C. Drive links on the chain will engage dog plates which are attached to the spline assembly. Drive will be complete with adjustment bolts for chain adjustment and an idler sprocket on the slack side of the drive chain.
3. The conveying surface of the inclined dispenser comprises a number of overlapping flites inclined to the horizontal at 22.5 degrees. Flites are manufactured in 12 gauge stainless steel type 304 with a # 4 brushed finish. Stainless steel flites incorporate a UHMW wear strip on the underside of the flites trailing edge.
4. Flites are fastened to metal splines which provide the necessary structural strength for the conveying surface. At the lower end of the flites, polyurethane dual hardness buffers are installed to arrest baggage as it is discharged from the feed conveyor and slides down the decline. Buffers are injection molded for accuracy and interchangeability and are bolted to support plates that are formed and bolted to the spines at the junction of the main conveying chain assembly.
5. Metal splines supporting the conveying surface are pressed from mild steel sheet into a channel section. These spines bolt to the main conveying chain assembly with two bolts at the lower end of the 22.5 degrees decline, while at the top end a precision sealed for life bearing wheel with a molded plastic tire is bolted to the spine. A nylon restraint strap is bolted between each spline to ensure that the correct pitch between flites is maintained and that unit comes smoothly out of corners.
6. Inclined dispensers intended for baggage claim function will have 12 gauge galvanized steel paneling. The toe recesses are fitted with black vinyl skirting. Paneling is bolted to the framework by domed fasteners.
7. Infill decking of 3/4" fire resistant plywood will be provided by contractor on units in the public area. Infill decking must be supported by a metal structure capable of supporting a dynamic load of 75 pounds per square foot. A hinged access door will be installed of sufficient size to easily permit the removal of drive components. Carpet or other finishes to the deck on inclined dispensers will not be the responsibility of the baggage handling systems contractor.

C. Electrical

1. The drive will operate on 480 VAC, 3 phase, 60 Hz power. A frequency drive, manufactured by AC Tech, will be used for soft start and speed control features. This drive will be capable of starting under full load.
2. One 120 VAC, single phase, 60 Hz duplex receptacle and one incandescent light will be installed in the vicinity of the drive - these will be the responsibility of the building contractor & not the baggage handling supplier

3.21 FLAT PLATE SORTATION DEVICES (PALLET LOOP CONVEYOR)

A. General:

1. Flat plate devices will be constructed of articulating flat pallets forming a continuous, rotating, claim or make up surface. They will receive baggage by hand loading or by a feed conveyor as indicated in the drawings. The unit will operate continuously at 90 feet per minute. Minimum overall width of the conveyor surface is 40 inches. The unit will have a useable tread width of 32 inches. Unit's elevation will be 12" to top of belt (unless indicated in the drawings).
2. Drive for the pallet loop conveyor will be of a "caterpillar" type drive mechanism. Unit will be driven by a single chain: double strand British standard with drive rollers spaced at 19 ½. Rollers on the chain will engage drive dogs of the underside of the carriage assembly for a smooth engagement. Drive will be complete with adjustment bolts for chain adjustment.
3. The caterpillar assembly will be driven by a close coupled motor / gearbox combination. Acceptable manufactures include: Morse (Invader), Dodge (Combination Tigear), SEW Eurodrive (S or K Series), or approve alternate.
4. Metal components, chassis, and paneling are all cut and pressed on precision CNC controlled machinery, then welded or sub-assembled in accurate jigs. During fabrication, processes used to form and fuse these metals do not stress fracture or damage the metals. All sharp edges, corners or burrs are removed or rounded prior to the coatings stage.

B. Design Data:

1. The frame and track will consist of modular assemblies bolted together to form a support structure and guide for the carriage & pallet assemblies. The support wheels are precisely located in angle 2" x 2 ½" angle iron with a minimum of 10 wheels under each pallet at time. Radius components will be rolled or formed structural steel. Structural supports for the track & center guide rails are spaced on a maximum of 5 foot centers.
2. The conveying surface of the flat plate conveyor comprises a number of articulating pallets which form a continuous loop around the perimeter of the device. The pallets are to be a minimum of 1/4" mild steel and fully encapsulated in polyurethane to a durometer of 85 on the shore a scale.
3. Each pallet is securely fastened to it's carriage by the use of 3 countersunk bolts.
4. Each carriage must be precision manufactured and jig welded to ensure accurate alignment. Each carriage is fitted with a precision, nylon lined, and spherical rod end bearing which permits articulation and reduces wear.
5. Pallet loop conveyors for baggage claim functions will have 12 gauge stainless steel trim paneling (#4 brush). The toe recesses are fitted with black vinyl skirting (6" tall). Trim paneling is directly bolted to the framework by domed fasteners.
6. Pallet loop conveyors for baggage make up areas will have 12 gauge galvanized steel trim paneling. The toe recesses are also fit with 12 ga. galvanized steel paneling. Trim paneling is directly bolted to the framework by domed fasteners.
7. Infill decking will be provided for units in the public area. Infill decking will be 3/4" fire resistant plywood supported by a metal structure capable of supporting a dynamic load of 75 pounds per square foot. A hinged access door will be installed with sufficient size to easily permit the removal of drive components in areas where the drive is located in the public area. Carpet or other finishes to the infill deck will not be the responsibility of the baggage handling systems contractor.

C. Electrical:

1. The drive will operate on 480 VAC, 3 phase, 60 Hz power. A variable frequency drive, manufactured by AC Tech, will be used for soft start and speed control features. This drive will be capable of starting under full load.
2. One 120 VAC, single phase, 60 Hz duplex receptacle and one incandescent light will be installed in the vicinity of the drive - these will be the responsibility of the building contractor & not the baggage handling supplier

3.22 SECURITY / FIRE DOORS

A. Door Details & Operation:

1. Doors must be rugged / heavy duty doors suitable for frequent cycling over a number of years.
2. Doors specified as to being a security door or fire door on the drawings. Fire blocking beside the conveyor where fire doors are provided will be the responsibility of the general contractor. Fire rating of door is to be as indicated on drawings (½ hour, 1 hour, 2 hour, etc)
3. Substrate (mounting) requirements to meet fire rating of the door shall be the responsibility of the general contractor.
4. Doors to be rolling “counter shutter” type doors.
5. Doors must be primed and painted metal (minimum 22 Ga. steel curtains) in the manufacturer’s standard color.
6. Doors in public view (which cannot be hidden behind draft curtains) must be constructed out of stainless steel (shutters and guides).
7. Doors must be fully interlocked with the BHS controls and system should not run until doors are in the fully raised position.
8. Doors must be provided with a manual method of opening in the event of electrical or controls failure (hand crank or chain hoist mechanism).
9. In the event that the door operator has exposed chains belts which are located less than 7 ½' above floor level, or at any height where they could be reached from the conveyor or catwalk, the drive mechanism must be fully guarded to prevent accidental entanglement. Guarding of door mechanism must not hinder manual operation of the door.
10. Doors must be provided with a “mechanical” safety edge on the bottom edge of the door so that in the event of the door coming down on a bag or other obstruction the door will automatically raise and stay in the raised position until reset at the control station or MCP. Photo electric safety edges are not acceptable. Safety edge to be manufactured by Miller and are the small profile (5/8" thick x 1"wide) type.
11. Doors must be installed in accordance with manufacturer’s specifications and must be fully tested and set during the testing of the baggage system.
12. Fire doors must be “drop tested” and witnessed by the BHS manufacturers representative and a representative of the owner.
13. BHS control manufacturer must provide dry contacts in the MCP panel to enable the doors & conveyor to be shut down by the fire alarm system in case of alarm.

- B. Approved Door Manufacturers
 - 1. Raynor Garage Doors
 - 2. Cornell Iron Works
 - 3. Overhead Door Co.
 - 4. Wayne Dalton

PART 4 - ELECTRICAL SPECIFICATIONS

4.1 GENERAL

- A. Related Standards and Codes: All components and materials will conform to applicable NEMA (National Electrical Manufacturer's Association) and JIC (Joint Industrial Council) standards. The requirements of the NEC (National Electrical Code), NFPA-70 and the American National Standards Institute Safety Code B20.1 will be met as well as those of any other governmental or local authorities having jurisdiction. All components will be designed for continuous duty service.
- B. Power Supply: All equipment supplied will be of the appropriate voltage to match the site power supply. The owner will furnish 480 Volt, 3 phase, 60 HZ power to the baggage contractors motor control panel (MCP) as shown on drawings
- C. Radio Interference:
 - 1. The equipment provided will not cause interference with communications within the airport; or between the airport and aircraft, or ground vehicles.
 - 2. All electrical and electronic equipment, including interconnecting wires and cables, will be designed to operate without malfunction in the presence of normal electromagnetic emission generated by other equipment, including the aircraft communication bands and high-power radar systems. Also, the environment may include various electrical motors and controls, power tools (including welders), automotive vehicles, etc.
- D. Standardization of Equipment: Where there is more than one item of equipment required under this contract, the contractor will furnish equipment of the same type and from the same manufacturer as much as possible. All components will be Allen Bradley, Cutler Hammer, or equivalent.
- E. Color Coding and Wire Marking: All electric wire and cable will be color coded and will have the wire numbers as shown on the electrical drawing affixed to both ends of each wire. Coding will be as follows:
 - 1. Power Wiring - Line side: This code applies to all power wiring from source to line side of fuses in control cabinets. The neutral, if applicable, will terminate at the terminal board.

Phase	120 / 208	277 / 480
A	Black	Yellow
B	Red	Brown
C	Blue	Orange
Neutral	White	Grey
Mechanical Ground	Green	Green

2. Power Wiring - Load side: This code for power and control wiring from the load side off uses in control cabinets to all other devices will be as follows:

Power	Black
A/C Control	Red
D/C Control	Blue
Neutral	White
Mechanical Ground	Green

- F. Controls: Controls will operate on a maximum of 120 volts. Control components will not be subjected to operation under loads exceeding the manufacturer’s recommended rating.

4.2 EQUIPMENT

- A. Enclosures: All electrical enclosures will be NEMA type 12, except those which may be exposed to the elements, which will be NEMA type 3 or 4 weatherproof.
- B. Motor Starters: All motor starters will be 3 pole, single throw, magnetic across the line contractors. Each will have holding contacts and auxiliary contacts as required. Starters will incorporate thermal 3 phase protection with manual reset. Reversing starters will incorporate both mechanical and electrical interlocks. Minimum starter size will be NEMA size “0”.
- C. Push Button Stations: Push button stations will be Allen Bradley 800T. All push button stations in the public view will be flush mounted with a stainless steel cover plate. Emergency stop push buttons will be of the maintained contact, push to stop, pull to reset. Button to be illuminated mushroom head type, Allen Bradley 800T.
- D. Selector Switches: Selectors switches will be Allen Bradley 800T (key operated where required).
- E. Pilot Lights: Pilot lights will be Allen Bradley 800T, push to test, transformer type. Lens color as required for the application.
- F. Photoelectric Controls: The sensors will be mounted on structural members attached to the

machinery structure so that a minimum of vibration is transmitted to these units. As well, sensor location is selected to reduce potential misalignment due to baggage, personnel or equipment. No more than one penetration per sensor, a maximum of 1- 1/2" in diameter, will be permitted in metal parts (conveyor guards). Sensors for tall bag detection, if required, will be mounted 32" above the conveyor surface. All other sensors will be mounted to detect an object 1 1/2" above the conveyor surface. Photo controls will be LED type, photo switch 42MRU series 5000.

- G. Relays: All relays will be rated for the application and will be Allen Bradley 700, type N or P.
- H. Timers: All time delay relays will be Allen Bradley 700, type PT.
- I. Limit switches: All limit switches will be of AB 802T non- plug type or Square D.

4.3 PANELS AND CONTROL STATIONS

A. Control Panel:

- 1. The main control panel will be designed to provide the following described functions at a minimum:

Hour meter	Over height Indicator
System Start	Emergency Stop
Hold in (Bypass) Circuit	Jam Detection Indicator
Start up / Trouble Alarm	
- 2. A graphic representation must be present on the door of the MCP and clearly indicate the following: system running jam locations, emergency stop, and overheight indicators.
- 3. System status panel: A system status panel will be furnished and installed in the control panel door when required by system complexity. A graphic representation of the system will be portrayed on the face of the panel. Indicator lights will be appropriately located on the map to identify sensing devices and emergency stop devices. Emergency stop indicator lights will be red; jam indicator light will be amber; and green run light will be provided for each individual subsystem.
- 4. An audible alarm will be mounted on the panel along with a silence button. This audible alarm will operate whenever a jam or emergency stop condition exists.
- 5. If a makeup sortation loop is used, a start button will be provided adjacent to the claim device. This button will start the claim unit and not start the related feed conveyors (unless otherwise specified).
- 6. An optional graphical interface can be installed at additional customer expense. This provides enhanced operational status and greater user flexibility, such as bag counting, motor current monitoring etc.

B. Control Stations: Control stations as indicated on the drawings will contain the following:

- 1. Ticket counters: System start button (to start respective system only - each station)
Emergency stop button (to stop respective system only - each station) Key operated "ON- OFF" selector switch (one station only).
- 2. Make-up area: Emergency stop button and claim device start button (if so equipped).

3. Jam control: Jam reset button (to reset the jam control circuitry and restart the conveyors that have been shut down).

4.4 CONTROL FUNCTIONS

A. System Start:

1. Activate a start-up warning beacon and horn (separate from emergency stop/jam/motor failure alarm) in final baggage delivery area.
2. Open all associated security doors (doors must be in the full open position before the system will be allowed to start).
3. After a predetermined time delay, the warning beacon and horn will shut off, and the respective system will start sequentially, beginning with the claim/discharge the conveyor.
4. If a flat or inclined plate claim or sortation loop is used, an Allen Bradley Power Flex 40 Variable Frequency Drive (or approved equal). This will soft start the drive unit for three seconds. Interlocks will be provided to prevent the respective conveyor system from starting until the loop has started. A start button will be provided for independent operation of the loop in make- up areas.

B. Emergency Stop:

1. The system may be stopped at anytime during normal operation by depressing any one of the emergency stop push- buttons.
2. Depressing the emergency stop push-button will cause the button to be illuminated, as well as illuminating all associated emergency stop buttons and the appropriate emergency stop indicator lamp on the system map located at the panel door of the MCP and sound an alarm to the control panel.
3. After clearing an emergency, the entire system may be restarted by resetting the emergency stop push-button and depressing the system start button. Initiation of the emergency stop will not close associated security doors.
4. Emergency stops must be designed and wired so that in the event of a PLC failure (and system is operating in bypass mode) all emergency stops remain operative.

C. Bypass / Reset of Circuit Timers:

1. A hold-in or reset circuit will be provided to ensure that all timers will not time out whenever the system is stopped by a jam, motor overload trip or emergency stop. This prevents baggage from becoming stranded between the load belt and the baggage delivery area or generating false jams.
2. A “bypass” switch must be provide on the MCP so that, in the event of a PLC failure, the system can be started manually. Emergency stops must remain operative at all times

D. Jam Detection:

1. Jam detection sensors will be located near the discharge end of all straight conveyors that feed a power turn. Jams will be detected by means of photo sensor for the timed period, that conveyor and all upstream conveyors will stop running. An indicator lamp

will illuminate at the appropriate location on the system map located on the panel door as well as an alarm buzzer will sound. The indicator lamp and buzzer will continue to be on until the jam has been cleared.

2. Upon clearing the jam, the jam detection circuit must be reset to extinguish the indicator lamp and permit those conveyors that have been shut down to resume operation. This will be accomplished by pressing a jam reset button which is to be located adjacent to the jam photocell (but off of the conveyor).
3. Jam detection circuitry will only function when the respective conveyor is running; i.e., if a conveyor stops running and, as a result, a bag blocks the jam detector photocell, a false jam indication will not be generated.
4. These photo sensors will be mounted so that they are able to detect the passage of low profile baggage. Cut-outs for photo sensors should be as small as possible to reduce potential bag jams.

E. System Stop (Automatic):

1. Automatic stopping of the system will be accomplished through a photoelectric sensor located at the discharge end of the load belt. Each time the system is started and an interruption of the photoelectric sensor beam occurs, a timing device is reset. After a time interval (1-15 minutes - user adjustable), suitable to ensure that the last bag of the load reaches its destination after detection by the photoelectric sensor, the timing device will time out and the conveyors not necessary to transport baggage from the inputs to the sortation/claim equipment will stop.
2. Auto stopping of the sortation or claim devices is to be accomplished through a timer (1-15 minutes, adjustable) which is activated after the preceding transport conveyors have stopped.
3. The timing devices will be disabled if any portion of the system that is required to transport baggage to the sortation or claim equipment is not running due to a jam, motor overload, or emergency stop.

F. Overheight Bag Detection:

1. Photoelectric overheight bag sensors will be positioned at the discharge end of each of the load conveyors stations. Interruption of the photoelectric beam will stop the associated load conveyor (s) and a marked indicator light will illuminate in the related push button control stations (s). Each sensor will be installed to detect the passage of the items higher than 2" below the lowest height obstruction in the system.
2. Once the overheight item has been removed, depressing the respective system start push-button will restart the stopped conveyors and turn the indicator lamp off. The indicator lamp will be installed in all push-button control stations located at load stations. The system start push-button that restarts the stopped conveyors will be installed in the push-button control station located nearest to the overheight bag sensor.

4.5 FIELD WIRING

- A. Controls: Controls will be located where shown on the drawings and herein specified.
- B. Disconnects: The contractor will furnish and install a non-fusible, manual disconnect switch, with provision for padlocking, in the circuit of each motor in the conveyor subsystems in

compliance with ANSI B20.1, paragraph 5.15.2.2. The disconnect switch must be within “sight line” of the motor and conveniently located for maintenance purposes.

- C. **Circuit Wiring:** All connections will be made with wire of current carry capacity consistent with the load and duty cycle. Wire will run continuously from one piece of apparatus to another without splices in conduit. Power wiring may be spliced in junction boxes as required. Control connections will be made on terminals with compression - type splices to conduit. Power wiring may be spliced in junction boxes as required. Control connections will be made on terminals with compression - type splices which will be enclosed in junction boxes
- D. **Conduit:**
1. Unless otherwise specified, all electric wiring will be enclosed in EMT conduit. Except in public areas, conduit will be installed exposed on walls ceilings, beams, columns, and on the conveyor structure. Locations of exposed conduit will be selected in order to minimize or prevent damage to conduit from vehicles or equipment. In public areas, conduit runs will be inconspicuous by running under cover plates, behind conveyors, or otherwise concealed from public view.
 2. Flexible conduit may be used for final connections to motors and all other devices requiring adjustments. All fittings for flexible conduit will be of the liquid - tight type. Installation will be in accordance with Article 351 or NEC-78.
 3. Outlet, junction and pull boxes, and cover plates will be suitable for use with EMT conduit and will conform to the National Electric Code for minimum wiring space requirements and material thickness. All boxes will have screw-fastened covers.
- E. **Wireways:** Wireways may be used where protection is adequate in accordance with Article 362 of NEC-78. Any wireways used will have hinged type covers.
- F. **Wire and Cable Conductors:** All power conductors will be a minimum of # 2, AWG, 600 volt, type THWN / THHN or THHN insulated stranded copper wire. All external control wire will be a minimum of # 14, AWG, type THWN / THHN or THHN stranded copper conductor, rated at 600 volts. All wires inside the control panel will be sized for current carrying capacity. Control wires to be a minimum of # 16, AWG, MTW, rated at 600 volts.
- G. **Marking of Equipment:**
1. In addition to all prime manufacturers’ nameplates, all electrical and mechanical control items mounted in or on a panel or push-button station will be further identified in the system by permanently attached corrosion resisting, etched, engraved, or stamped identification plates.
 2. All fuses, starters, timers, relays, etc. in the MCP must be clearly marked - fuses must be marked with their detailed designation and amperage (ie- CCMR 71/2). Failure in marking in the MCP will be considered a punch list item for correction.
- H. **Permits and Licenses:**
1. All electrical permits, licenses, etc., will be obtained and paid for by the contractor.
 2. All required permits, licenses, etc., must be in place before the commencement of work

END OF SECTION 14540