

10.1.2.	Arrivals Reclaim carousel and associated items delivery	1	Set
10.1.3.	Arrivals Steelwork, walkways, cross-overs etc	1	Set
10.1.4.	Arrivals Controls hardware, including panels, field equipment etc	1	Set
10.2.	<i>Departures</i>		
10.2.1.	IG and OOG Departures Conveying equipment, doors and other miscellaneous equipment delivery	1	Set
10.2.2.	Check-in Equipment including, check-in desks (2 pcs.) weigh scales, weigh/label conveyors, despatch conveyor and bag	1	Set
10.2.3.	Departures Steelwork, walkways, cross-overs etc	1	Set
10.2.4.	Departures Controls hardware, including panels, field equipment, etc	1	Set
11.	Installation Stage		
11.1.	<i>Arrivals</i>		
11.1.1.	Arrivals Conveying equipment, doors and other miscellaneous equipment installation	1	Set
11.1.2.	Arrivals Reclaim carousel and associated items installation	1	Set
11.1.3.	Arrivals x-ray integration	1	Set
11.1.4.	Arrivals Radiation detector integration	1	Set
11.1.5.	Arrivals Steelwork, walkways, cross-overs etc	1	Set
11.1.6.	Arrivals Controls hardware, including panels, field equipment etc	1	Set
11.1.7.	Arrivals SCADA System	1	Set
11.1.8.	Relocation and integration of an existing departure OOG device into a new arrival line, LAN and electricity cabling	1	Set
11.2.	<i>Departures</i>		
11.2.1.	Conveyor and miscellaneous equipment installation (in Gauge transport)	1	Set
11.2.2.	OOG Departures Conveying equipment, doors and other miscellaneous equipment installation. New and re-located/removed items.	1	Set
11.2.3.	Check-in Equipment including, check-in desks (2 pcs.) weigh scales, weigh/label conveyors, despatch conveyor and bag knock-overs. New and re-located/removed items.	1	Set
11.2.4.	Departures Steelwork, walkways, cross-overs etc	1	Set
11.2.5.	Departures Controls hardware, including panels, field equipment, etc	1	Set
11.2.6.	Radiation detector integration	1	Set
11.2.7.	Integration with SBD	4	units
11.2.8.	Integration with EDS	1	Set
11.2.9.	Integration with OOG x-ray	1	Set

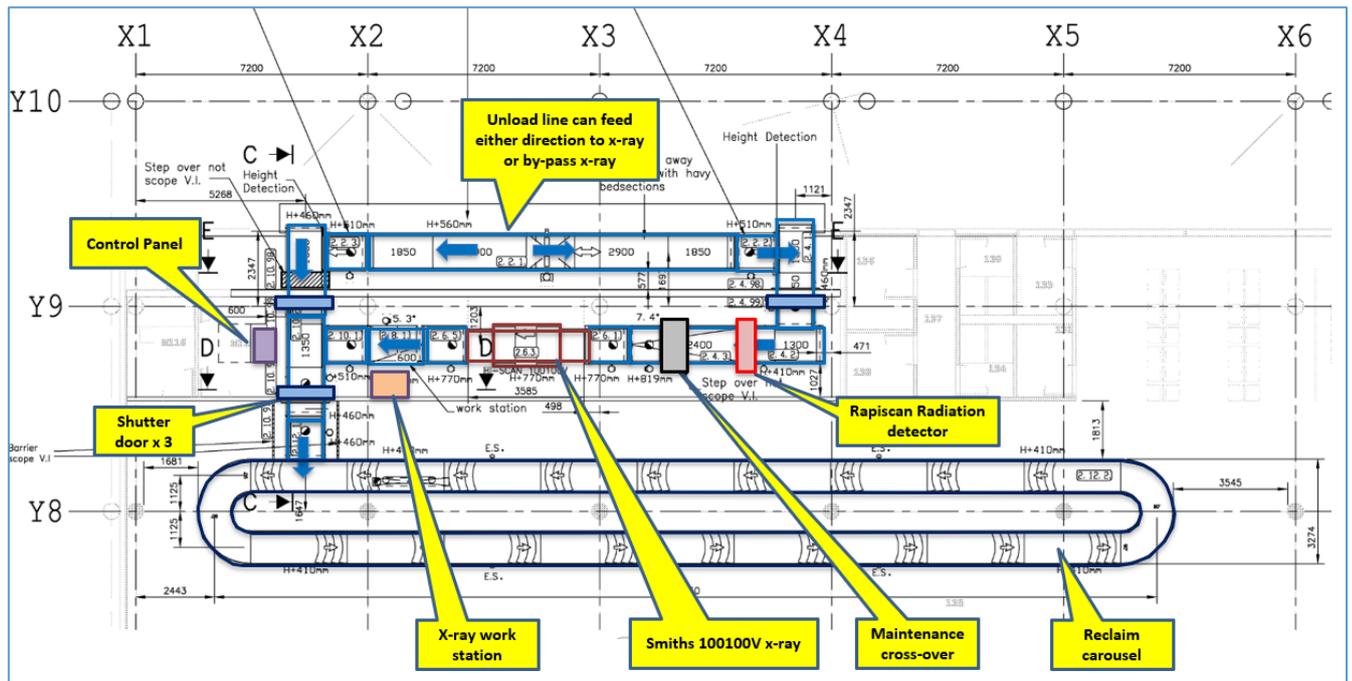
11.2.10.	Departures SCADA System	1	Set
12.	Commissioning, Testing and Training Stage		
12.1.	<i>Arrivals</i>		
12.1.1.	Test Bags and associated costs	1	Set
12.1.2.	Integration to fire alarm system	1	Set
12.1.3.	BHS System Commissioning and Testing	1	Set
12.1.4.	SCADA System Commissioning and Testing	1	Set
12.1.5.	SAT Testing	1	Set
12.1.6.	HBVS Testing	1	Set
12.1.7.	Settling Down Trial	1	Set
12.1.8.	Confidence Trial	1	Set
12.1.9.	Training	1	Set
12.2.	<i>Departures</i>		
12.2.1.	Test Bags and associated costs	1	Set
12.2.2.	Integration to fire alarm system	1	Set
12.2.3.	BHS System Commissioning and Testing	1	Set
12.2.4.	SCADA System Commissioning and Testing	1	Set
12.2.5.	SAT Testing	1	Set
12.2.6.	HBVS Testing	1	Set
12.2.7.	Settling Down Trial	1	Set
12.2.8.	Confidence Trial	1	Set
12.2.9.	Training	1	Set
13.	System Handover Stage		
13.1.	O&M manuals, inc as-built Drawings and complete H&S files	1	Set
14.	Warranty and Service Stage		
14.1.	Warranty and maintenance services (1st year of system operation) – services to ensure continuous operation of the System, including spare parts	1	Year
14.2.	Warranty and maintenance services (2nd year of system operation) – services to ensure continuous operation of the System, including spare parts	1	Year
14.3.	Warranty and maintenance services (3rd year of system operation) – services to ensure continuous operation of the System, including spare parts	1	Year
14.4.	Warranty and maintenance services (4th year of system operation) – services to ensure continuous operation of the System, including spare parts	1	Year

14.5.	Warranty and maintenance services (4th year of system operation) – services to ensure continuous operation of the System, including spare parts	1	Year
15.	Miscellaneous services and goods		
15.1.	Project Management	1	Set
15.2.	Servers, network equipment, and all cabling from servers (LAN and electricity). Cabling must include OOG and EDS	1	Set
15.3.	Licenses of software, hardware, and system software (if licensed software is used)	1	Set
15.4.	Additional optional services of implementation/modification of BHS (extra working hours or service hours for project change management)	200	Hours
15.5.	Other costs – Tenderer to list and identify	1	Set

## 23 EXISTING BHS DESIGN

### 23.1 EXISTING ARRIVALS SYSTEM

23.1.1 The Existing Arrivals BHS is located on the First (Ground) Floor of the Terminal, and is generally as shown below:

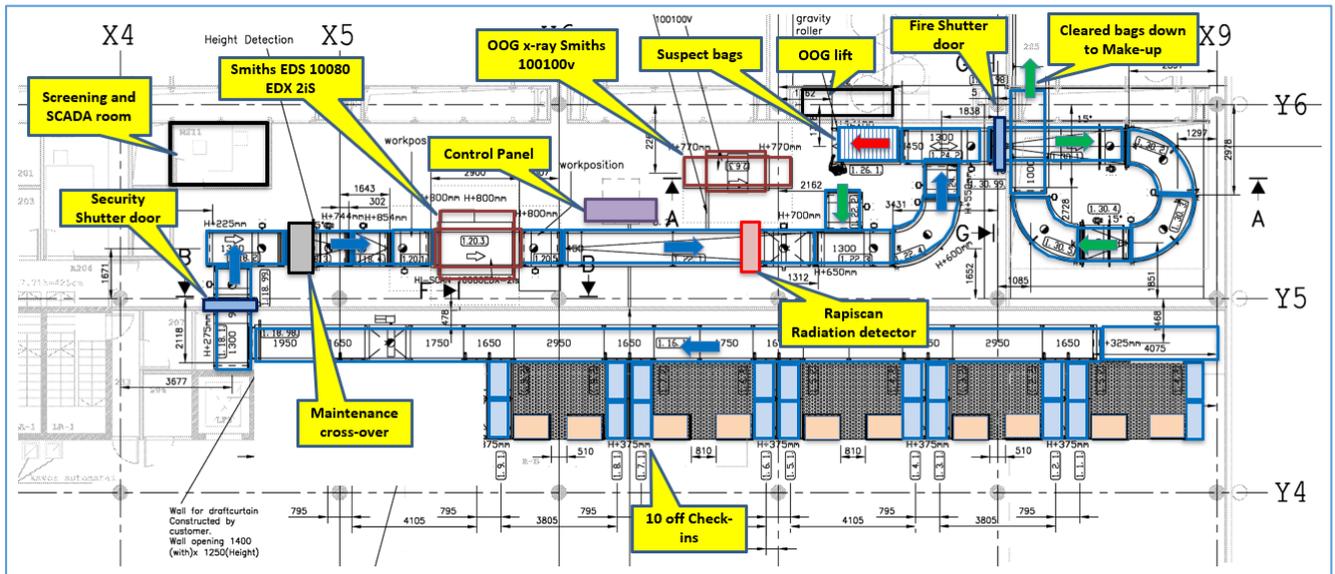


23.1.2 The Existing Reclaim BHS was supplied by Vanderlande Industries in 2007/8, and includes the following key features:

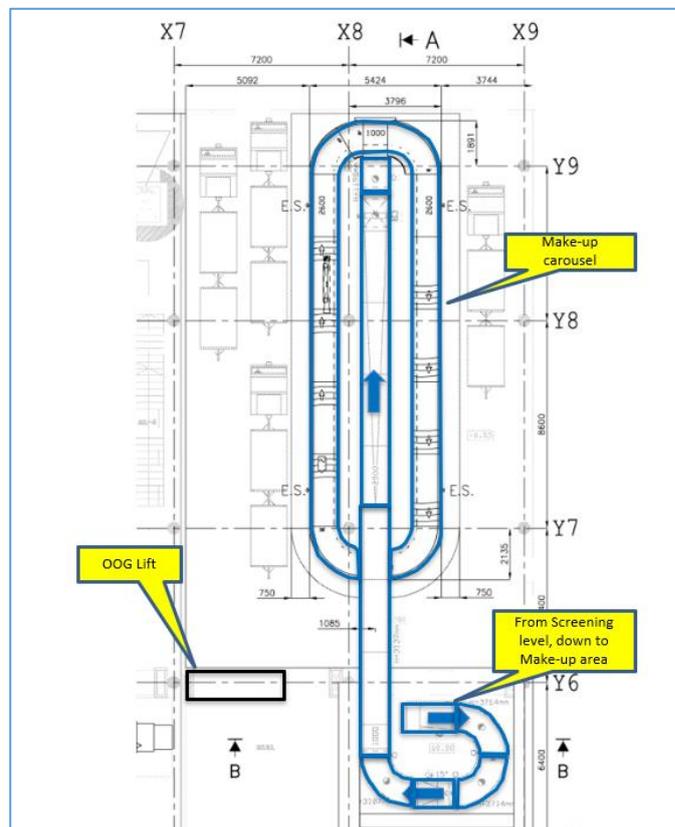
- 23.1.2.1 Bi-directional unload conveyor
- 23.1.2.2 Direct conveyor route to carousel, by-passing screening
- 23.1.2.3 Alternative conveyor route to carousel which includes Radiation Detector (Rapiscan) and Screening machine (Smiths 100100v) to be used for selected flights by Customs or Security Services.
- 23.1.2.4 Horizontal over-lapping rubber slat type Reclaim carousel
- 23.1.2.5 Integrated roller shutter Security doors (3 off)
- 23.1.2.6 Stand-alone Control panel and Controls system
- 23.1.2.7 This Arrivals (and Departures) system is reported and monitored via the BHS SCADA system

## 23.2 EXISTING DEPARTURES SYSTEM

23.2.1 The Existing Departures BHS Check-in and Screening System is located on the Second Floor of the Terminal, and is generally as shown below:



23.2.2 The Existing Departures BHS Make-up System is located on the First (Ground) Floor of the Terminal, and is generally as shown below:



- 23.2.3 The Existing Departures BHS was supplied by Vanderlande Industries in 2007/8, and includes the following key features:
- 23.2.3.1 Ten (10) off check-in positions. Each is a 2-stage module comprising weigh/label and despatch conveyors. Integrated weigh scales built into conveyor, with desk mounted weigh displays.
  - 23.2.3.2 Uni-Directional collector and delivery conveyor linking check-in area to screening area
  - 23.2.3.3 Integrated Standard 2 Screening machine (Smiths EDS 10080 EDX 2iS) for In-gauge bags.
  - 23.2.3.4 Screening line includes bag spacing, pitching, height and length checks, tracking zone for level 2 screening, and a switching 'T' junction to separate cleared and suspect bags to make-up or search area.
  - 23.2.3.5 Bag re-inject conveyor for cleared bags after level 3 screening has been completed.
  - 23.2.3.6 Rapiscan Radiation detector mounted over conveyor line.
  - 23.2.3.7 Cleared bag conveyor line which descends from the screening area to the make-up area below.
  - 23.2.3.8 Incline type over-lapping rubber slat type Make-up carousel located at ground floor level
  - 23.2.3.9 Integrated roller shutter Security door between check-in and screening area (between grids X4-X5)
  - 23.2.3.10 Integrated roller shutter Fire door between check-in and screening area (between grids Y5-Y6)
  - 23.2.3.11 Stand-alone Control panel and Controls system
  - 23.2.3.12 This Departures (and Arrivals) system is reported and monitored via the BHS SCADA system
  - 23.2.3.13 OOG bags are portered manually from the check-in area after passenger check-in and screened via a stand-alone x-ray (Smiths 100100V) located in the screening area. Cleared OOG bags are placed into a dedicated goods type lift for transporting down to the make-up area.

## 24 PROPOSED UPGRADED BHS DESIGN

### 24.1 GENERAL BHS REQUIREMENTS

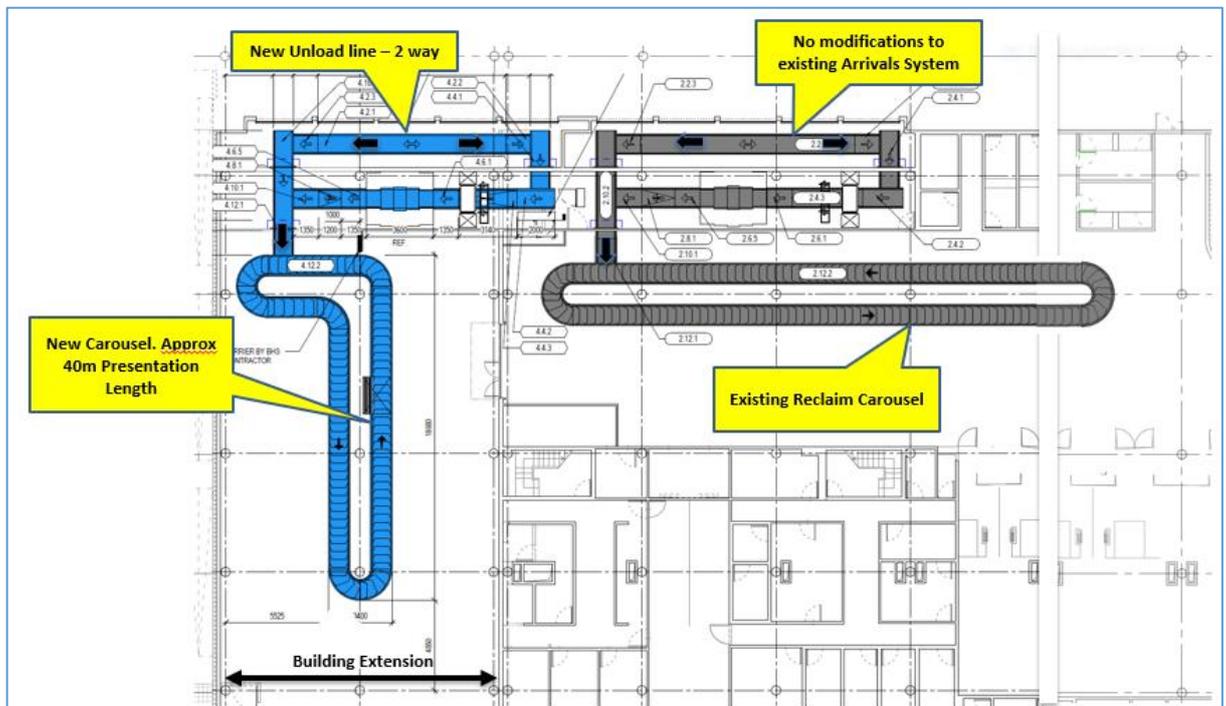
- 24.1.1 BHS equipment shall support the planned software version updates.
- 24.1.2 BHS must be fitted with the energy saving function. Unless it interferes with the baggage transportation and inspection procedures, the transporters shall be stopped when there is no baggage on them and automatically turned on when the baggage appears on the transporter belt.
- 24.1.3 All software versions of provided solutions (equipment) must be up to date, newest stable version.
- 24.1.4 Supplier must provide all boxes required for Systems components: junction boxes, outlet boxes, boxes for control and other equipment.
- 24.1.5 The Supplier shall handover all the rights of management, administration, correction and expansion of the installed equipment and shall also provide all the passwords, user and administration manuals. The Buyer shall inform the Supplier about the changes it performs.
- 24.1.6 All communications infrastructure shall be hidden in the respective trays or ladder. No open cables shall be left.
- 24.1.7 All the proposed equipment shall be new and unused.
- 24.1.8 The Supplier must install mirrors and provide moving platforms or ladders for the detection and removal of baggage jams.
- 24.1.9 All System users must be authenticated. The login/logoff times of all users and the changes they make are stored in the events log for an established configured period of time.
- 24.1.10 In the passenger registration post, the GH employee shall be provided with an option to turn on the BHS, check if BHS functions properly and the scales are set to zero.
- 24.1.11 GH staff shall be provided with an option to mark if the baggage is suitable and can be transported on the conveyor for further inspection.
- 24.1.12 If the baggage is too long or above or below the permissible weight (both light sensors of the weighing conveyor are activated), the baggage shall not be sent, the light indication is turned on and the baggage is removed from the scales.
- 24.1.13 After the command "Send" is received, BHS automatically reserves a "virtual window" (gap) on the collection conveyor. When this window passes through the check-in desk, the sending transporter is turned on and the item of baggage is pushed on the collection transporter belt.
- 24.1.14 BHS must reserve a "virtual window" for each check-in desk in the chronological order subject to the fact when and from which check-in desk the baggage departed.
- 24.1.15 BHS shall inform the baggage screening personnel on the forced non-sanctioned placement of baggage on the collection transporter, register the event in BHS events log and request further actions from the baggage handling operator.

- 24.1.16 All check-in desks shall be provided with equal opportunities to depart baggage on the collection transporter belt in case of high BHS load.
- 24.1.17 The procedure of reservation of virtual windows shall ensure that the first check-in desks according to the direction of movement of collection transporter could not occupy all virtual windows, whereas the last one would not have to wait for an open virtual window.
- 24.1.18 When the dedicated virtual window approaches the desk, the baggage collection transporter turns on automatically and the item of baggage is placed on the collection transporter belt. If due to any reasons item of baggage was not placed on the collection transporter belt and the virtual window remained open, such virtual window shall be filled with the item of baggage from the other nearby check-in desk according to the priority, whereas the other virtual window is immediately reserved for the non-placed baggage.
- 24.1.19 Each check-in station shall consist of the following:
- 24.1.19.1 weighing/marking and sending transporter control panel;
  - 24.1.19.2 integrated scales with display for the passenger and operator. The producer of conveyor scales – Atrax, Mettler Toledo, Söhnle, or adequate;
  - 24.1.19.3 mechanical tilting device for tilting the vertically standing baggage on the side (the tilting devices shall be mounted at an intersection of check-in conveyor and the collecting conveyor; exact placement to be offered by the Supplier);
  - 24.1.19.4 emergency BHS stop button;
  - 24.1.19.5 BHS control buttons;
  - 24.1.19.6 The system must allow the administration to set the maximum allowable baggage weight.
  - 24.1.19.7 The GH agent must be informed when:
    - 24.1.19.7.1 Baggage is too long;
    - 24.1.19.7.2 Luggage is too heavy;
    - 24.1.19.7.3 There is an error in the system or a baggage jam;
    - 24.1.19.7.4 The system is in operational mode.
- 24.1.20 To launch and stop BHS, it is necessary to provide sufficient amount of audible warning devices ensuring that the warning signal to be turned on 10 seconds before the launch of equipment will be clearly audible in the entire BHS system.
- 24.1.21 Light sensors shall be installed to track baggage jams on transporters. The baggage jam tracking algorithm checks if there is no transporter blocking or baggage jam on the transporter. In case of detection of blocking or baggage jam, the transporter is stopped and the place of congestion is showed in the structural scheme in the service personnel workstation. The error is shown until the failure is removed and the System is launched again.
- 24.1.22 Provide jam detection photocells and a jam indicator with a jam/restart/emergency stop control station in areas that have a relatively high frequency of jams. This shall include the discharge ends of all conveyors feeding onto power turns, at the bottom of incline and decline conveyors, at all merges for conveyor lines, opposite all diverters, and at any other location where experience indicates a potential jam point.
- 24.1.23 Use light beacons to alert operators and maintenance staff of the status of the Equipment: Jam / Motor overload / Oversize Reset. Provide light beacons along conveyor at a maximum of 30 meter intervals and such that there is always at least one within the line of sight.
- 24.1.24 BHS equipment shall be resistant to wearing, shocks and scratches, as well as resistant to effects of external environment.

- 24.1.25 Stainless steel installations shall be used in the areas that are visible to the passengers.
- 24.1.26 All steel or metal structures and components must be protected against rust, scratches and angles. Spherical corners, edges or joints must be removed.
- 24.1.27 All metal components used in the system must be protected against corrosion.
- 24.1.28 The entire equipment in the public places shall be clean-line type, without any bolts, nuts or welding (must comply with European Machinery Directive).
- 24.1.29 It must be possible to control baggage sorters / diverters manually;
- 24.1.30 Emergency stop buttons are installed in the entire system to allow the personnel to stop the system in case of emergency.
- 24.1.31 Each emergency stop device must be connected with the BHS control system. The personnel working with BHS should not stand more than 10 meters away from the nearest emergency stop device. In case any of the emergency, stop buttons are pressed, the entire System shall be stopped immediately. Until the button is kept pressed down, the "emergency shutdown" is indicating in the maintenance workstation and the location of pressed button is indicated

## 24.2 ARRIVALS BHS EXTENSION

- 24.2.1 The Arrivals BHS will be extended generally as shown below:

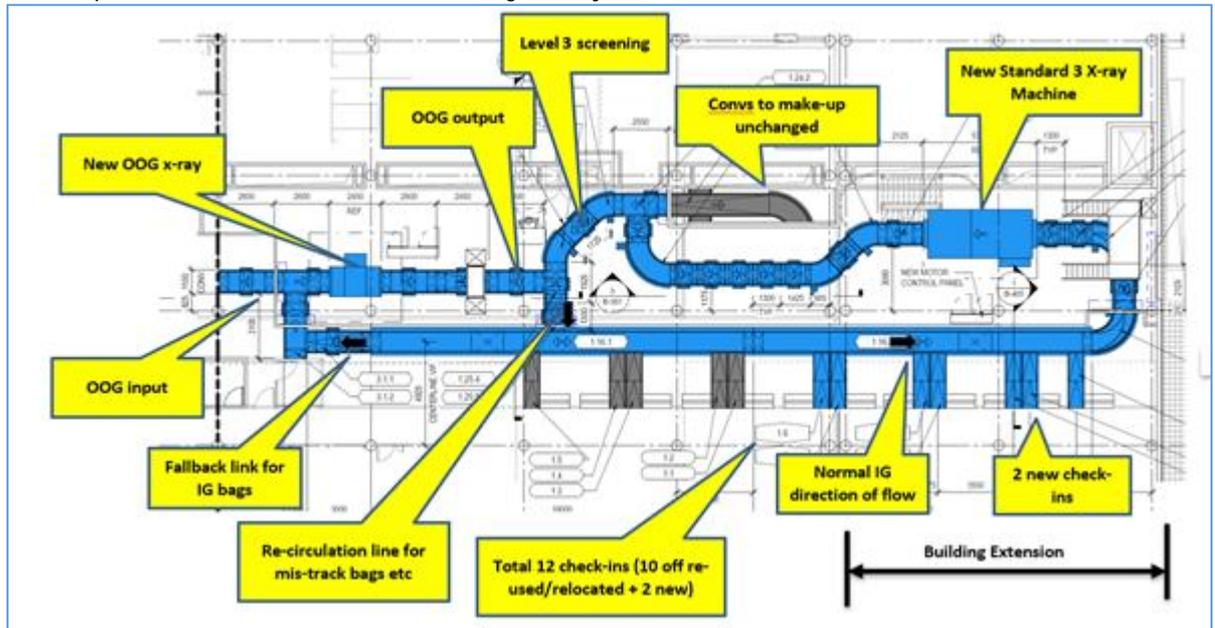




## 24.3 DEPARTURES BHS UPGRADE

24.3.1 This project is to increase check-in capacity and to upgrade the screening systems to meet Standard 3.1 legislation.

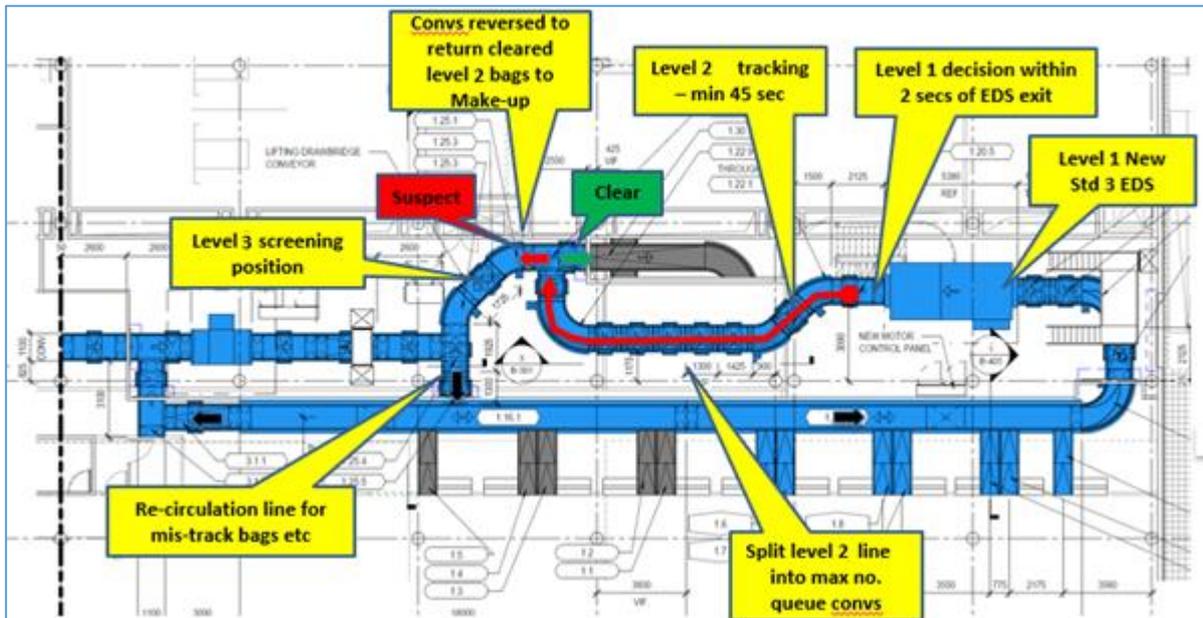
24.3.2 The Terminal Building will be extended by 2 grid bays to accommodate the extension and modifications to the Departures BHS at check-in floor level is generally as shown below:



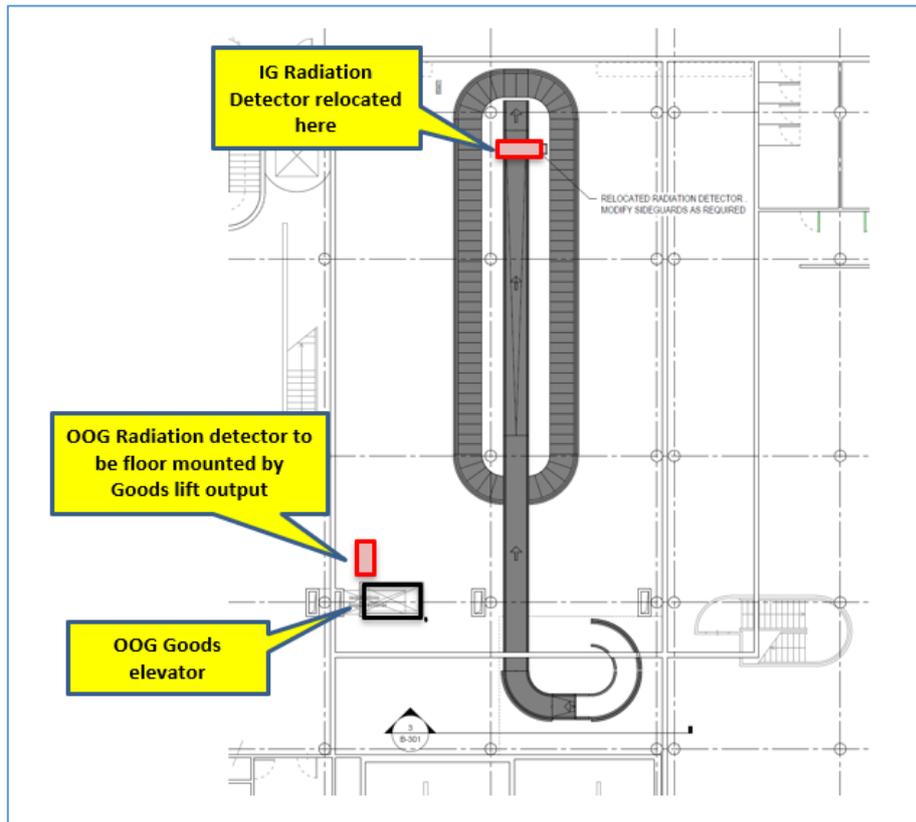
24.3.3 The Upgraded IG Departures BHS includes the following key elements:

- 24.3.3.1 2 off new check-ins to give a total of Twelve (12) off check-in positions. 6 off existing check-ins to remain in their existing locations, and 4 off existing check-ins will need relocating into the building extension.
- 24.3.3.2 Each check-in is made up of a 2-stage module comprising weigh/label and despatch conveyors. Integrated weigh scales built into conveyor, with desk mounted weigh displays.
- 24.3.3.3 The existing check-in desks will be re-used, with at least 4 needing repositioning by the Supplier.
- 24.3.3.4 The Supplier must provide, install and integrate 2 new check-in desks. (Note – new desks will be 1000mm wide, existing are 1250mm)
- 24.3.3.5 The collector conveyor is to be modified and made bi-directional as shown.
- 24.3.3.6 The 'normal' direction of travel for IG bags will be left to right as shown to deliver bags to the new Standard 3.1 screening machine located in the Terminal extension.
- 24.3.3.7 It should be possible to reverse the collector, to run right to left, to be able to route IG bags into the OOG screening machine during fall-back conditions.
- 24.3.3.8 New roller shutter security doors and draught curtains are to be provided at the points where the conveyors pass the landside/airside boundary. These doors are fully integrated into the BHS and will only be automatically opened only when the BHS is operational and processing bags.
- 24.3.3.9 Provision of new IG conveyors, and spiral curves between check-in, and the new Standard 3.1 EDS machine.
- 24.3.3.10 The IG Standard 3.1 EDS machine will be provided free issue; however, the Supplier has integration responsibilities per the matrix within the Appendix here-in.
- 24.3.3.11 The free issue Standard 3.1 machine will be provided with a number of level 2 workstations which are used by Security. Additional workstations are also supplied for use by Customs who require access to the same bag images to allow them to analyse bag contents and reject suspect bags to the level 3 position also.
- 24.3.3.12 Bag knock-overs are to be provided between check-in and screening to lay bag flat and into a stable position for screening and bag tracking
- 24.3.3.13 Bag separation. spacing, pitching, height and length checks, to be provided on the conveyors between check-in and the Standard 3.1 EDS to provide bag conditioning to suit the needs of the EDS machine.

- 24.3.3.14 A manual interface point, with operator control panel, is required prior to the Standard 3.1 EDS machine to allow over-height/over-length bags to be manually dealt with.
- 24.3.3.15 A bag input position is required prior to the EDS machine to allow Image Quality Test bags (IQT) to be input for machine calibration purposes. This can be integrated into the manual interface position described above.
- 24.3.3.16 Provision of new conveyors and curves for the level 2 screening and bag tracking line, to provide a minimum of 45 seconds for the screening process, on assumption that the level 1 decision is made by the EDS machine within 2 secs of the machine exit, as shown below:

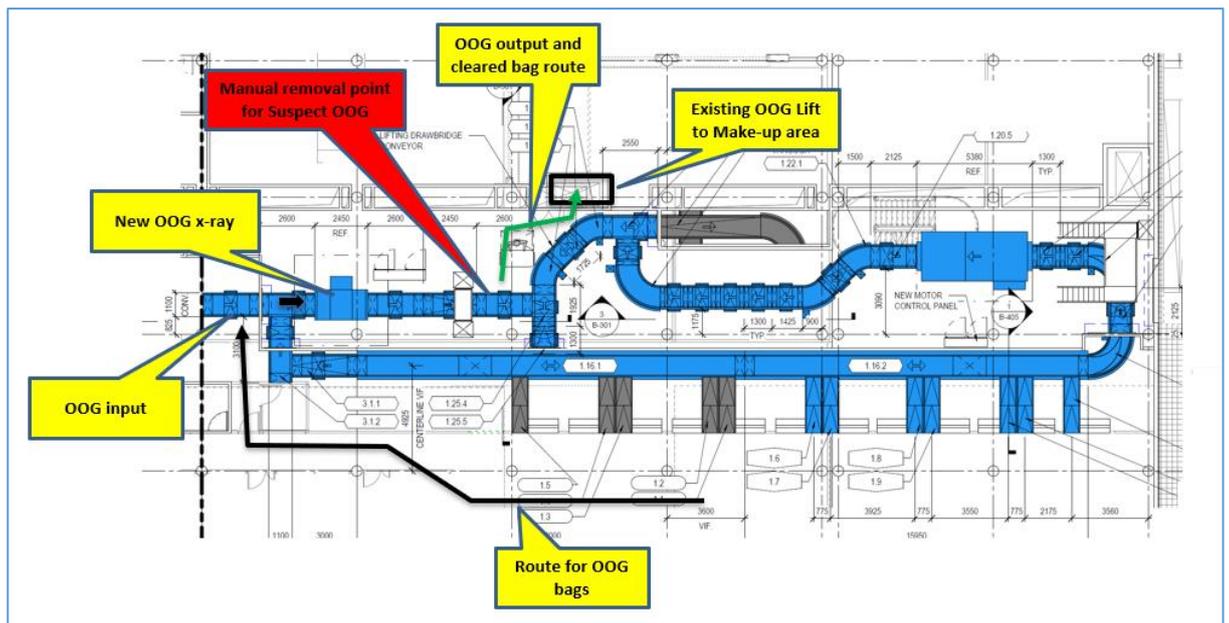


- 24.3.3.17 This level 2 tracking line to be split into as many queue type conveyors as practical to allow for system die-back to both maximise time available for level 2 screening, and minimise system die back to the x-ray and also to check-in.
- 24.3.3.18 A bag output position is required after the Standard 3.1 machine to allow Image Quality Test bags (IQT) to be removed during the machine calibration process.
- 24.3.3.19 New or re-used switching 'T' conveyor to separate cleared bags, which are routed to make-up, from other bags (suspect, no-decision, time-out, mis-track etc) bags which are routed in the opposite direction towards the level 3 operator position.
- 24.3.3.20 Level 3 operator position to allow manual bag intervention. All suspect bags must stop in this position awaiting manual intervention at level 3. The reason why a bag has been rejected needs to be clearly displayed at this point (eg Security suspect bag or Customs suspect bag).
- 24.3.3.21 An EDS workstation is to be located alongside the Level 3 position to allow operators to see the x-ray image alongside the bag. If necessary, the operator can remove the bag from this position for further analysis (eg via the OOG x-ray, or other handheld devices, or for passenger reconciliation).
- 24.3.3.22 It should be possible to reverse the level 3 conveyor to allow cleared bags to be routed down to make-up via the cleared bag route.
- 24.3.3.23 Provision of new Recirculation conveyor line. Mis-tracked bags, and no-decision time out bags can be routed automatically back to the IG EDS machine via this line, by re-injecting the bag into the rear of the collector line as shown.
- 24.3.3.24 Provision of a new roller shutter security door and draught curtain at the point where the recirculation line passes the landside/airside barrier. This door is fully integrated into the BHS and will be normally closed, except when a bag requires recirculating, in which case it will open for enough time to allow it to pass, and then will be automatically closed.
- 24.3.3.25 The existing Departures Radiation Detector is to be removed and re-installed over the IG cleared conveyor line, on the decline section just before the make-up carousel. This will be integrated into the BHS controls system. Relocation work will be performed by other Suppliers. The Supplier will need to perform the integration of the radiation detector into the BHS system.



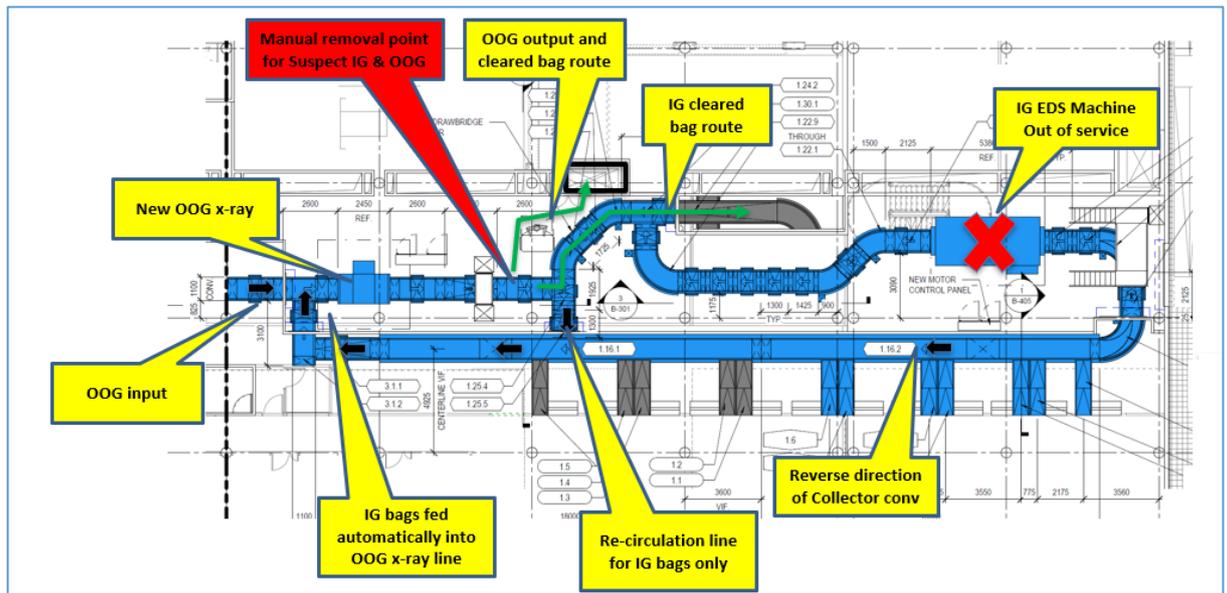
- 24.3.3.26 The existing cleared bag conveyor line which descends down from the screening area to the make-up area below should be re-used for the same purpose. The roller shutter fire door at this position will also be retained.
- 24.3.3.27 The Make-up carousel located at ground floor level will be re-used for the same purpose for IG bags.
- 24.3.3.28 Conveyor crossovers and access walkways are to be provided to allow operator and maintenance access to all parts of the BHS and both sides of the EDS machine.

## 24.3.4 The Upgraded OOG Departures BHS includes the following key elements:



- 24.3.4.1 A new OOG input conveyor, located at the left-hand end of check-in is to be provided. This should be suitable for side loading of OOG bags, by either passengers or porters.
- 24.3.4.2 The OOG line also has an integrated roller shutter Security Door and draught curtain between check-in and screening area.
- 24.3.4.3 A new OOG x-ray machine and associated workstations will be provided free issue, however, the Supplier will have responsibility to install, wire, and integrate this machine per the responsibility matrix here-in.
- 24.3.4.4 Similar to IG screening, x-ray workstations are provided by others and available to both Security and Customs operators to view the same baggage images.
- 24.3.4.5 New conveyors are to be provided before and after the x-ray for the purpose of inputting and outputting OOG bags.
- 24.3.4.6 OOG bags will be held on the conveyors after the x-ray pending x-ray operator's decision.
- 24.3.4.7 Once a decision has been made, cleared bags can be manually removed from the OOG output conveyor immediately before the 'T' junction, and placed into the existing OOG lift in a similar way to existing. The bag will then be routed down to the make-up area via this goods lift.
- 24.3.4.8 Bags which are deemed suspect by either Security or Customs will also be removed from the OOG output conveyor for further analysis or for passenger reconciliation.
- 24.3.4.9 Only once the OOG bag is declared as being safe will it be placed into the goods lift for routing to make-up.
- 24.3.4.10 A new OOG Departures Radiation Detector is to be provided and installed adjacent to the OOG goods lift exit within the bag hall by others. See sketch in previous section. This will be a 'stand-alone' unit and will not be integrated into the BHS controls system. When it alarms, Security will have a process to deal with the potential threat.

24.3.5 It shall be possible to use the OOG Screening line for IG bags during fallback conditions, including the following features:



- 24.3.5.1 If there is a failure on the new IG screening line (eg x-ray or conveyor out of service) it should be possible to reverse the direction of the IG collector line to route bags through the OOG screening line.
  - 24.3.5.2 It shall be possible to use all 12 check-ins during this mode, although the processing capacity will be reduced during this mode.
  - 24.3.5.3 Conveyors linking the IG collector to the OOG input line are to be provided. These will normally only run when in fallback mode.
  - 24.3.5.4 Knock-over devices are required between IG check-in and the merge point to the OOG line.
  - 24.3.5.5 An integrated roller shutter Security Door, and draught curtain is required between check-in and screening area on this fallback line.
  - 24.3.5.6 IG bags will be screened in a similar manner to that described above for OOG bags.
  - 24.3.5.7 Cleared IG bags will be allowed to continue and merge onto the IG line at the 90-degree merge point adjacent to the level 3 work station, so as to pass down to the make-up carousel without manual intervention.
  - 24.3.5.8 Suspect IG bags will be dealt with in a similar manner to suspect OOG bags as described above.
  - 24.3.5.9 It should be possible to also use the OOG input for OOG bags when running in this mode. Merge control at the IG/OOG merge point should be adopted. It should not be possible to route OOG bags down to the make-up carousel via the conveyor route.
  - 24.3.5.10 It should be possible to use the recirculation line in this mode, but only for IG bags.
- 24.3.6 No Mechanical changes are envisaged to the decline conveyors to make-up area, nor to the existing make-up carousel, nor the OOG lift.
- 24.3.7 The existing controls system will need to be upgraded and modified to accommodate the changes to the mechanical layout.
- 24.3.8 The design is to allow continued operation in the event of a failure of any collector, delivery line, or screening machine. Control zones are to be isolated from each other such that any MCP or PLC failure does not impact overall baggage delivery.
- 24.3.9 The SCADA system needs to be installed new to include new and existing Arrivals systems, as well as the revised Departures system.

## 24.4 GENERAL SCOPE REQUIREMENTS

- 24.4.1 The BHS shall be designed such that all reasonable bag types and profiles can be transported without the use of tubs. To achieve this, the Supplier will need to pay particular attention to the design including but not limited to the following:
- 24.4.1.1 Keeping the conveyors as smooth and level as possible to maintain the integrity of the baggage 'window' and transitions between conveyors.
  - 24.4.1.2 Designing and engineering out all 'snag' points within the baggage system.
  - 24.4.1.3 Ensuring all incline / decline angles within the BHS design are to be kept to a minimum.
  - 24.4.1.4 Applying special attention to baggage transitions at merges and junctions

## 24.5 DEMOLITION/MODIFICATIONS TO EXISTING SYSTEM

- 24.5.1 The Supplier shall be responsible to modify any existing BHS equipment (whether they are shown on the drawings or not) that are in the way of the new BHS ROW's including but not limited to support structures, conveyors, walkway, platforms, screening equipment support, roller doors etc. Coordinate with other Contractors for work required to services that are in the way of the new BHS ROW's or modified BHS ROW's. Modifications shall encompass removal of existing BHS equipment and rerouting / modification of all work necessary to allow routing of the new equipment and to return the existing system to an operational state. Coordinate and minimize any interruptions to the existing system operations during the existing systems modifications. Obtain specific approval in writing to take any existing operational equipment out of service and minimize to the greatest extent possible the time which such equipment is out of service including working multiple shifts in order to bring the affected equipment back into service as quickly as possible.
- 24.5.2 If required, Supplier will have to obtain all required accesses and permissions to modify current solutions ( to meet expansion requirements (PLC, control cabinets, all other software or hardware). In all cases Supplies can propose to change solutions to new.
- 24.5.3 BHS supplier should Identify all building modifications and alterations required to install the BHS over and above those shown on the contract drawings in the bid documents. Any additional building modifications and/or alterations not so identified in the contract shall be borne by the Supplier.
- 24.5.4 Attention is drawn to the existing conveyor supports between the departs IG screening area and the delivery line down to make-up. These may need modifying to accommodate the new IG screening line.
- 24.5.5 The list below table outlines the existing equipment to be removed. This list shall not be considered all inclusive:
- 24.5.5.1 Existing Departures x-ray type Smiths EDS 10080 EDX 2iS – This to be moved to a storage location at the Airport, actual position to be agreed.
  - 24.5.5.2 Existing Departures OOG x-ray type Smiths 100100V - This to be relocated and re-used within the new Arrivals line.
  - 24.5.5.3 Existing IG conveyors between the collectors and the point where cleared bags are allowed to decline to the make-up area below.
  - 24.5.5.4 Existing roller shutter between check-in ad screening area. Includes electrical disconnect and alarms etc
  - 24.5.5.5 As a minimum, 4 off existing check-in conveyors and desks are to be removed and relocated into the building extension area.
  - 24.5.5.6 It is also envisaged that at least one other check-in and desk will need temporary removing and re-instating in its original position to allow access during the phasing to install/modify the collector line.
  - 24.5.5.7 The existing Departures radiation detector may need removing and re-instating to suit its new position and to enable the new OOG line to be installed. These works will be carried out by other parties if necessary.

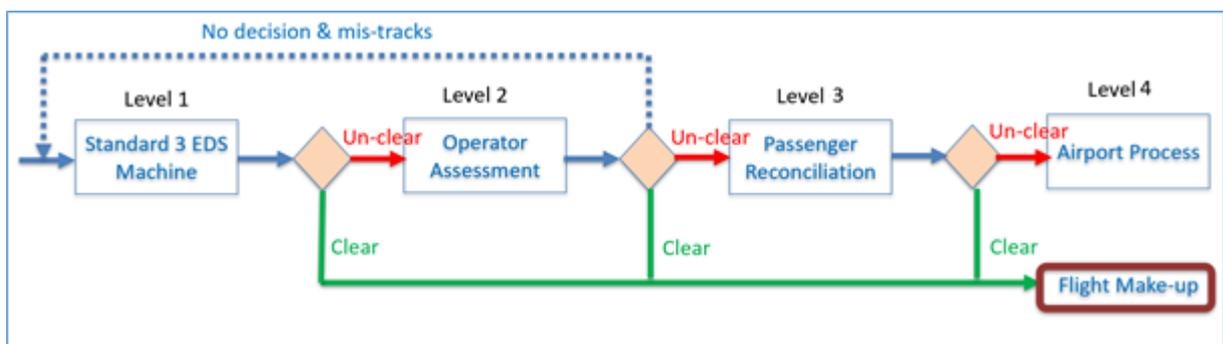
## 24.6 PHASED INSTALLATION WORKS

- 24.6.1 The new Arrivals BHS is effectively a stand-alone sub-system and can be installed and tested without any disruption to the existing Arrivals sub-system and operation. Since the existing Departures OOG x-ray machine is to be integrated into the new Arrivals line, the install programme and phasing between Arrivals and Departures will need to take this into account. The Supplier should ensure that any installation works, hoardings etc do not restrict the use of the existing Arrivals unload line and carousel.
- 24.6.2 The Departure system needs to be phased and installed in such a manner to minimise any disruption to passengers and airline operations. Reference should be made to the Phasing drawings within the BHS Drawing package, which detail a minimum requirement of a 7-phase installation plan. During the Contract Design stage, the Supplier should develop this phasing plan in greater detail and submit for Approval.
- 24.6.3 Coordinate and minimize any interruptions to the existing system operations during the existing systems modifications. At no point shall existing system operations be affected in such a way that the check-in capacity of the existing BHS is reduced to less than 5 desks, for more than 24 hours, without explicit agreement with the Buyer and an agreed contingency plan put in place. The existing OOG facility shall remain in operation until the complete IG system is fully installed to provide redundancy during this period.
- 24.6.4 Obtain specific approval in writing to take any existing operational equipment out of service and minimize to the greatest extent possible the time which such equipment is out of service including working multiple shifts in order to bring the affected equipment back into service as quickly as possible.

## 25 HOLD BAGGAGE SCREENING - SECURITY

### 25.1 GENERAL – IG BAGS - DEPARTURES

- 25.1.1 The in-gauge departures baggage handling system is to incorporate an automated ECAC Certified Standard 3.1 CT EDS Machines. The Supplier will be informed of the chosen supplier and model before commencement of the detailed design phase.
- 25.1.2 The Supplier will be responsible for the interface, installation and integration of the equipment of the selected EDS machine supplier.
- 25.1.3 The objective of the in-line security screening system is for all bags to be mechanically conveyed through the minimum number of screening levels necessary to achieve 100% security, whilst maintaining the throughput performance of the baggage system as defined here-in. This System should comply with the multi-level HBS process as indicated below.



- 25.1.4 Those bags which are not cleared at one particular level must be directed (either physically or in a control sense) to the next level for further analysis. In general, each successive screening level will involve a longer cycle time per bag and therefore the quantity of bags elevating to these levels needs to be minimised to reduce impact on system throughput.
- 25.1.5 The Supplier shall provide a suitable recirculation line for baggage that mis-tracks (either within the EDS machine or on the conveyor route), bags with no image or part image, and bags that are timed-out during the process and no decision has been made. If a bag continues to mis-track or fails more than once to get a satisfactory image, it must be identified and routed out of the system for manual screening/inspection.
- 25.1.6 Workstations will be provided, by others, for both Security and Customs purposes, and can be operated individually or in parallel.

### 25.2 LEVEL 1 SECURITY SCREENING (AUTOMATIC)

- 25.2.1 100% of all Departing hold baggage items are processed through a Standard 3.1 EDS machine. The Standard 3.1 EDS machine automatically detects any threats and sends the screened bag image to a workstation(s) for analysis by a Security screening operator (Level 2). Bags that are not detected as a threat by the Standard 3.1 EDS machine are specified as cleared and can be routed to make-up.
- 25.2.2 In certain operational scenarios an operator assessment is required for every bag i.e. the automated decision by the Standard 3.1 EDS machine is not utilised as part of the HBS process. The Standard EDS 3 machine will be operating in a "show-all" mode during these scenarios. It should be possible to operate the EDS machine in this mode, and the BHS should process clear and un-clear bags in the same way as above. The screening mode is selectable via the EDS workstations.
- 25.2.3 Whilst 100% of bags are screened at level 1, typically 75-85% would be automatically cleared at level 1 and the remaining 15-25% referred to level 2 for further analysis.

### 25.3 LEVEL 2 SECURITY SCREENING (OPERATOR)

- 25.3.1 Images of un-cleared level 1 bags are directed to a manned Level 2 workstation for further analysis. The level 1 EDS machine would normally highlight the threat element of the image for a more focussed operator review.
- 25.3.2 Level 2 consists of multiple operator workstations linked to the level 1 machine(s) via a matrix server and network, or in some cases direct. These workstations are located in a dedicated screening room and images are distributed to the workstations as soon as a workstation becomes available. The decision to accept or unclear the image of each bag is made by the operator, although he may want to consult with a Supervisor or colleague for a second opinion before making the final decision. If in any doubt, the bag should be rejected to level 3.
- 25.3.3 The BHS should allow a minimum of 47 (2 to complete lev 1 decision + 45 for level 2) seconds from the bag exiting the level 1 EDS machine to the level 3 diverter. If a bag has no decision by the time it reaches the diverter, it should be allowed to wait on the conveyor immediately before the diverter until either a decision is made, or until the BHS screening line die-backs to a point where further waiting time will put the EDS into die back. In this way, it should be possible to increase the level 2 screening time apart.
- 25.3.4 The Supplier shall ensure adequate predictive die-back control arrangements are made to ensure that bags are not halted within the EDS machine during die-back events to minimise the occurrence of level 1 incomplete data bags
- 25.3.5 The level 2 decision is communicated to the control system via the level 1 machine interface. Cleared baggage will be sent to the make-up area and suspect bags will be sent to Level 3 position.
- 25.3.6 Mis-tracked bags, timed-out bags, and bags with incomplete images will be routed back to level 1 for re-screening.

### 25.4 LEVEL 3 AND 4 SECURITY SCREENING (OPERATOR)

- 25.4.1 The level 3 area should be provided with a display panel or any other technological solution to clearly identify the reason why a bag has arrived at this point
- 25.4.2 Any bags that remain uncleared after the level 2, will normally be removed from the conveyor and requires the level 3 operator to either:
- Examine the bag using ETD either with the passenger present or not.
  - Call the passenger for manual opening and inspection of their bag (Level 3) or
  - If the passenger fails to attend the bag opening/inspection, the bag is referred to level 4.
- 25.4.3 Bags that are cleared after level 3 screening can be manually re-entered onto the level 3 conveyor, and the level 3 line reversed to route the cleared bag to make-up.
- 25.4.4 Bags that remain suspect after level 3 are referred to level 4. A bag can be classified as level 4 at any level from level 2 onwards, depending on the operator's assessment of the potential threat. This status should be clearly displayed once the bag arrives at level 3.
- 25.4.5 Level 5 procedures are outside the scope of the Supplier, and will be dealt with by specialist Security operators. Normally this would include stopping the BHS and evacuating the area whilst the threat is dealt with.

### 25.5 HOLD BAGGAGE SCREENING - OOG

- 25.5.1 The existing stand-alone OOG Departures x-ray machine will be removed and replaced with a new integrated OOG x-ray machine, which will be supplied by others, but installed and integrated by the Supplier.
- 25.5.2 The new OOG x-ray will be a conventional x-ray machine. The Supplier will be informed of the chosen supplier and model before commencement of the detailed design phase.
- 25.5.3 The x-ray will work in "Show all" mode which will rely on an operator decision for every bag.
- 25.5.4 Workstations will be provided, by others, for both Security and Customs purposes, and can be operated individually or in parallel. Positions of the workstations to be agreed with the Buyer.
- 25.5.5 This machine will normally process OOG bags but will also be used for IG bags during fallback conditions.
- 25.5.6 Any suspect bags will be manually removed from a holding conveyor on the exit side of the x-ray machine and referred to Level 3 and 4 screening processes as described above for IG bags.
- 25.5.7 Cleared OOG bags will also be removed from the holding conveyor, and manually loaded into the existing goods lift for transporting down to the make-up area.
- 25.5.8 When processing IG bags through the OOG line in fallback mode, then cleared IG bags can be automatically conveyed and merged at 90 degrees onto the IG line at the point where the OOG and IG lines meet, for routing down to the make-up carousel.

## 25.6 HOLD BAGGAGE SCREENING - CUSTOMS

- 25.6.1 Customs require access to images of ALL Departing bags on both the IG and OOG lines via dedicated Customs workstations.
- 25.6.2 Customs workstations will not always be operational; however, Customs have the option to man workstations at specific times of day, or during processing of specific flights to review bag images.
- 25.6.3 The Customs screening operator shall be able to reject and direct suspect bags to the level 3 area, for both IG and OOG bags.
- 25.6.4 The BHS shall visually inform the level 3 Security operator that the baggage was rejected due to Customs reasons, rather than Security.
- 25.6.5 In instances, the bag may be rejected for both Security and Customs reasons, and this should be visually informed to the Operator. In this instance, the Security issue would normally be dealt with first.
- 25.6.6 Bags that have been cleared by both Security and Customs can be routed to make-up, as described above.

## 25.7 ARRIVALS BAGGAGE SCREENING

- 25.7.1 The existing OOG Departures x-ray machine (Smiths 100100V) will be relocated by the Supplier and re-used within the new Arrivals unload line.
- 25.7.2 Arrivals bags can be routed direct from unload to reclaim carousel or can be routed via the screening loop. This should be manually selectable by either Customs or Security on a flight by flight basis.
- 25.7.3 The x-ray will work in "Show all" mode which will rely on an operator decision for every bag and can be operated by either Customs or Security.
- 25.7.4 Any suspect bags will be manually removed from a holding conveyor on the exit side of the x-ray machine and dealt with locally by the screening operator.
- 25.7.5 Cleared bags will be conveyed and merged onto the Reclaim carousel for passenger collection.

## 25.8 SCREENING EQUIPMENT – PROVIDED BY OTHERS

- 25.8.1 The Buyer will appoint an EDS supplier under a separate direct contract to supply the new In-Gauge (IG) Standard 3.1 and Out of Gauge (OOG) EDS Machines. This equipment will be supplied on a free-issue basis to the Supplier.
- 25.8.2 The EDS supplier will provide installation supervision, Image Quality Test (IQT) bags, integration specifications, manuals and necessary documentation, test and commissioning samples, and attendance during integration testing and commissioning. Refer to Responsibility Matrix between the EDS supplier and Supplier, this can be found in the Appendix here-in.
- 25.8.3 Equipment models and quantities are to be confirmed, however, the following is a guide:
- Departures IG:
- 1 off Standard 3.1 IG X-ray machine (min 600 bph capacity, nom 0.3m/sec)
  - 2 off Security Operator workstations for level 2 screening
  - 2 off Customs Operator workstations
  - 1 off Operator workstation for Level 3 area
  - 1 off Operator workstation for Training purposes etc
- Departures OOG:
- 1 off OOG x-ray machine (min 240 bph capacity, nom 0.2m/sec)
  - 1 off Security Operator workstations
  - 1 off Customs Operator workstations
- New Arrivals sub-system:
- 1 off standard 2 IG x-ray for Arrivals (Smiths EDS 100100V) – currently used in Departures OOG
  - 1 off Operator workstation, to be used by either Customs or Security.
- 25.8.4 The Buyer will provide Radiation Detection equipment on a free-issue basis to the Supplier, and may include re-use of existing devices, or new, or a combination of both, as follows:
- Departures IG and OOG:
- 1 off IG Radiation Detector – anticipated to be located over the cleared decline conveyor, although final location is to be agreed with the Buyer
  - 1 off OOG Radiation Detector – anticipated to be located as free standing unit on OOG goods lift exit, although final location is to be agreed with the Buyer
- New Arrivals sub-system:
- 1 off Radiation Detector – located over conveyor, similar to existing line.

## 26 PERFORMANCE REQUIREMENTS

### 26.1 BHS THROUGHPUT – ARRIVALS

26.1.1 The BHS needs to be able to sustain the following throughput rates for a minimum 15-minute period, to be demonstrated during SAT testing, using a mixture of random sized test bags.

26.1.1.1 New Arrivals unload line, by-passing screening route = 500 bags/hr

26.1.1.2 New Arrivals unload line via x-ray screening route = 240 bags/hr

26.1.1.3 New Arrivals Reclaim carousel = 500 bags/hr

### 26.2 BHS THROUGHPUT – DEPARTURES

26.2.1 The BHS needs to be able to sustain the following throughput rates for a minimum 15-minute period, to be demonstrated during SAT testing, using a mixture of random sized test bags.

26.2.1.1 Departures IG system from check-in to make-up via Standard 3.1 screening = 600 bags/hr

26.2.1.2 Departures OOG system from unload to removal point via OOG x-ray = 240 bags/hr

26.2.1.3 The OOG line should also be able to automatically process IG bags from check-in, through to make-up, during fallback conditions (reversal of IG collector) at a rate of 240 bags/hr

### 26.3 NORMAL IN GAUGE (IG) BAGGAGE CHARACTERISTICS

26.3.1 Baggage will be presented to the BHS in a great variety of materials, shapes and sizes with all manner of straps, labels and handles attached.

26.3.2 Each item shall have at least one flat conveyable surface. Baggage meeting the above size limitations but lacking a flat conveyable surface (such as baby carriages, round duffel bags, and the like) shall be processed in standard airline tubs or via the OOG line.

26.3.3 Design the BHS to handle a complete spectrum of materials found in air transport baggage, including paper, cardboard, cloth/canvas (e.g. duffel bags), plastic, leather, wood, metals, and any other material that may be used as a baggage item in the following conditions:

- Dry to Wet
- Paper/cloth/plastic tape/wrapping
- Plastic/steel bands
- Fibre cord
- Twine
- Wheels
- Straps

26.3.4 The maximum weight of IG bags which shall be successfully handled by the system shall be 32 kg, the minimum weight of normal baggage shall be 2 kg.

26.3.5 The dimensions of normal baggage (laid down) which shall be successfully handled by the BHS shall be between the following limits:

Dimension	Maximum	Minimum
Length	900mm	200 mm
Width	750 mm	200 mm
Height	450 mm	50 mm
Diagonal (length/width)	1100 mm	400 mm

26.3.6 The height is the smallest of the three orthogonal dimensions; however, the Supplier should be aware that bags may be presented in any orientation.

26.3.7 Conveyors which cross or run under structural steel/slabs/services will be designed for a minimum 900 mm height clearance from the top of the belt, unless otherwise specifically agreed with Buyer. The Supplier should endeavour to check these clearances throughout the project to ensure the requirements are met.

26.3.8 The BHS shall be designed to minimise handling/tracking problems resulting from bags which:

- 26.3.8.1 Move during stopping and starting operations, at conveyor junctions or at injection points and may cause blockages, delays or bag jams.
- 26.3.8.2 Move, touch or overlap an adjacent bag thus forming a "long bag" which cannot be processed automatically by downstream diversion, screening or merging systems.
- 26.3.8.3 Lose position on conveyor belts or other moving equipment.

## 26.4 OUT OF GAUGE BAGGAGE

26.4.1 Bags which fall outside the baggage input statement and normal baggage characteristics are to be designated Out of Gauge. Unsuitable normal bags, thus treated as Out of Gauge include push chairs/strollers, bag trolleys, open framed items, golf clubs, fishing rods, skis, surf boards, un-cased musical instruments, etc. These items shall be processed separately through the existing Out of Gauge lifts and stand-alone screening machines.

26.4.2 The maximum weight of OOG bags which shall be successfully handled by the system shall be 60 kg, the minimum weight of normal baggage shall be 2 kg.

26.4.3 The dimensions of OOG baggage (laid down) which shall be successfully handled by the BHS shall be between the following limits:

Dimension	Maximum	Minimum
Length	2400mm	200 mm
Width	750 mm	200 mm
Height	750 mm	50 mm
Diagonal (length/width)	2450 mm	400 mm

26.4.4 The height is the smallest of the three orthogonal dimensions.

26.4.5 Signage should be provided to instruct operators and/or passengers how best to input OOG bags onto the loading conveyor eg length parallel to flow, smallest dimension as height.

## 26.5 TRACKING PERFORMANCE

- 26.5.1 A minimum of 99.0% of bags must be successfully tracked when tracking between the X-ray Machines and the final screening decision point. A bag is considered mis-tracked if the bag has moved from the tracking datum by an amount greater than the minimum bag length.
- 26.5.2 The Supplier shall demonstrate Tracking Performance during Testing and with live baggage for the duration of the Confidence trial.
- 26.5.3 Bag tracking statistics should be logged and recorded within the BHS SCADA system on an hourly, daily and weekly basis.
- 26.5.4 Each bag that has lost tracking must be reported in the SCADA. If 3 successive bags lose tracking at the same location, the tracking control system must automatically raise a critical alarm to the SCADA and stop the relevant conveyor.
- 26.5.5 Tracking methodology shall be designed to ensure that tracking statistics are accurate and that lost bags are minimised wherever possible.
- 26.5.6 Should Tracking drop below the above in the first 12 months of Operation, then the Supplier should investigate, report the reasons to the Buyer, and rectify at their own cost to return the Tracking back to the specified levels

## 26.6 SYSTEM AVAILABILITY

- 26.6.1 The Supplier shall demonstrate the following Availabilities for the duration of the Confidence Trial period.
- 26.6.2 Sub-System availability eg Arrivals line, OOG line, and IG screening line = 99.9%
- 26.6.3 Overall System Availability = 99.8%
- 26.6.4 During the Confidence Period the system the system should be Operational for a minimum of 20 hours per day. The times of day to be agreed with the Buyer before the start of the Confidence Period.
- 26.6.5 Routine maintenance should always be carried out outside of Operational hours.
- 26.6.6 Sub-System and System availability statistics should be logged and recorded within the BHS SCADA system on an hourly, daily and weekly basis.
- 26.6.7 Should Availability drop below the above in the first 12 months of Operation, then the Supplier should investigate, report the reasons to the Buyer, and rectify at their own cost to return the Availability back to the specified levels.

## 26.7 BAG JAM FREQUENCY

- 26.7.1 The Supplier shall demonstrate that bag jams do not exceed 1 in 5,000 bags (0.02%) for the duration of the Confidence Trial period.
- 26.7.2 The Supplier should log and photograph or video every bag jam during the Confidence Trail and provide a report explaining reasons for each.
- 26.7.3 If it can be demonstrated that Out of specification bags were input into the system by the Check-in staff, then these can be excluded from the Bag Jam calculation.
- 26.7.4 Should the Bag Jam Frequency increase above the stated level in the first 12 months of Operation, then the Supplier should investigate, report the reasons to the Buyer, and rectify at their own cost to return the Availability back to the specified levels.

## 26.8 NOISE LEVELS

- 26.8.1 Design, fabricate and install the BHS to limit combined equipment and controlled ambient noise levels to no more than the maximum levels defined below or if lower values are required by applicable laws, codes and standards without the use of hearing protection, to those lower levels. Submit sound levels of all proposed

Location of Noise Measurement	Max Noise Level
In adjacent or nearby office areas (measured at the centre of room at a height of 1500 mm above the floor).	45 dB(A)
In any ceiling void above public areas, offices and public spaces (measured at a number of positions normally occupied by passengers, public and staff).	65 dB(A)
In BHS operational spaces (e.g. baggage make-up area, transfer/reclaim inputs)	75 dB(A)
In BHS technical spaces and all other associated non-public areas or unoccupied areas.	75 dB(A)

- 26.8.2 The BHS equipment must not increase the ambient noise level by more than 15 dB (A).
- 26.8.3 Unless otherwise specified the measurements must be taken at a maximum distance of 1000 mm from noise producing components.
- 26.8.4 The noise level must be the Equivalent Continuous Sound Pressure Level measured over a period of one minute or more at each location.
- 26.8.5 Noise level measurements must be taken during non-operational hours to ensure passenger conversations or movements do not unduly increase the ambient noise levels in public areas.

## 27 EQUIPMENT AND SYSTEM KEY REQUIREMENTS

### 27.1 ENVIRONMENTAL CONDITIONS

27.1.1 The Supplier shall ensure that the mechanical and controls equipment be designed to operate in protected areas where temperature and humidity is maybe uncontrolled. The environmental Temperature and Humidity ranges are as follows:

- External Temperatures -20° to 40° Celsius
- External Relative Humidity 5 to 90%
  
- Temperatures within make-up and technical areas 5° to 40° Celsius;
- Temperatures within passenger areas 15° to 25° Celsius;
- Temperatures within EDS workstation/SCADA room 15° to 25° Celsius;
- Internal Relative Humidity 40 to 60%

27.1.2 The Supplier shall ensure that any exhaust gases or condensate produced by the EDS machines or air conditioning systems must be expelled outside the building or plumbed to suitable drainage points within the terminal.

### 27.2 SERVICES

27.2.1 Mains Supply 400V +10% -6% 3PH 50Hz

27.2.2 Note: the EDS machines may require a conditioned power supply. This needs to be co-ordinated with the nominated x-ray supplier and be provided if required. The Supplier is to provide power cabling etc to the EDS machines.

### 27.3 HOURS OF OPERATION

27.3.1 The system and equipment are to be designed on the basis of the following hours of operation:

- 20 hours per day
- 365 days per year

27.3.2 Scheduled maintenance should be carried outside these operating hours, unless by agreement with the Buyer.

### 27.4 LAYOUT REQUIREMENTS

27.4.1 The Supplier shall review the attached layouts as well as all technical requirements. The Supplier is fully responsible for the system design, performance, efficiency and all internal and external interfaces of the system. The BHS drawings provided are intended to define the anticipated final layout and phasing logistics and are not intended to define every function or requirement, hence the Supplier should develop the solution to meet the defined requirements.

27.4.2 Design the BHS to accommodate the following physical constraints imposed on the System by either operational or facility considerations.

27.4.3 The following guidelines must be followed for the detail design of the system:

- 27.4.3.1 At all make-up positions and vehicle drive aisle locations a minimum of 3000 mm vertical clearance above the driving surface must be maintained.
- 27.4.3.2 Minimum clearance on all conveyors, between the surface on which the bag is transported to underside of any obstruction must be 900 mm unless otherwise noted on the drawings.
- 27.4.3.3 Provide minimum 2100 mm height clearance at all staff circulation/walkways and at manned work areas

- 27.4.3.4 Any conveyor crossovers are to be min 750mm wide. Those used for Operational access ie regular daily access required for bag processing purposes, should use stairs as the means of access.
- 27.4.3.5 Conveyor cross overs that will only be used for occasional maintenance access may be fitted with ships ladder access, if it can be demonstrated that stairs cannot fit into the location.
- 27.4.3.6 Provide a minimum of 2100 mm clear height for all crossovers and walkways.
- 27.4.3.7 At all locations where the clear height is less than 2100 mm install padding on the obstruction across the full length of the walkway to protect maintenance personnel from injury. Padding must be an appropriate and durable rubber or foam with a minimum thickness of 15 mm permanently attached. The padding must be yellow with black stripes. Safety signage must be provided at each obstruction.
- 27.4.3.8 Provide cross-overs and walkways to ensure compliance with all applicable codes and standards, the requirements of these specifications and to ensure that sufficient maintenance access points are provided to meet the performance criteria of these specifications and the Operations and Maintenance specifications and to provide a safe, efficient and easily maintainable system.

## 27.5 QUEUE CONVEYOR REQUIREMENTS

- 27.5.1 The Contract drawings show the minimum number of queue conveyors to be supplied, however, the Supplier should also comply with the requirements listed below.
  - 27.5.1.1 At least two (2) metering conveyors must be provided immediately upstream of any vertical sort or merge unit (VSU, VMU, HSD/Plough, T junction)
  - 27.5.1.2 At least two (2) metering conveyors must be provided immediately upstream of any horizontal 45-degree merge conveyor.
  - 27.5.1.3 At least one (1) metering conveyors must be provided immediately upstream of any merge conveyor, make-up carousel or reclaim carousel.
  - 27.5.1.4 A minimum of three (3) queue conveyors immediately upstream of and one (1) queue conveyors immediately downstream of each Departures IG screening machine shall be provided.
  - 27.5.1.5 A minimum of one (1) queue conveyors immediately upstream of and one (1) queue conveyors immediately downstream of each OOG screening machine shall be provided.
- 27.5.2 If the above requirements related the number of metering conveyors cannot be achieved due to building space limitations, coordinate rearrangement at these locations and obtain design approval from the Buyer.

## 27.6 CONVEYOR SPEEDS

- 27.6.1 Provide equipment speeds necessary to achieve specified processing rates, transport times and decision times.
- 27.6.2 Make speed changes between adjacent conveyors of no more than 10 m/min or 20% increments so as not to adversely affect baggage spacing or tracking. If it's necessary to make bigger speed changes, then variable speed drives should be provided to increase the speed in a controlled manner across conveyor junctions to minimise bag slippage.
- 27.6.3 Conveyor speed changes between adjacent conveyor segments must be such that bag tracking requirements are not compromised.
- 27.6.4 Measured conveyor speeds in the field must be within 10% of the design speeds listed in the conveyor schedule.

## 27.7 STATIC & DYNAMIC EQUIPMENT LOAD REQUIREMENTS

- 27.7.1 Size conveyor drives and components so that starting and stopping may be accomplished under full load conditions.
- 27.7.2 Design the BHS so that drive sizes are between a minimum of 0.55 kW and a maximum of 4.0 kW except for check-in feeder conveyors where smaller motors down to a minimum of 0.37 kW are permissible.

- 27.7.3 For single direction conveyors, locate drive units in close proximity to the head end of the conveyor, unless otherwise shown on the drawings or unless this location hinders maintenance. For reversible conveyors, locate drives in the centre of the conveyor.
- 27.7.4 The dead loads imposed on the building composed of the conveyor components, supports and baggage used for designing structural elements, rollers and pulleys must be a maximum 2.4 kN/m except for merges and OOG conveyors, in which case it must be no more than 3.0 kN/m and the maximum point load at any conveyor support must be no more than 7.5 kN.
- 27.7.5 All conveyor equipment must be capable of supporting a single concentrated live load of 1.1 kN.
- 27.7.6 Drives, motors, belts, bearings, pulleys and all other conveyor components for loading conveyors, accumulation conveyors, reclaim devices and make-up devices must be sized utilizing 0.7 kN/m live load.
- 27.7.7 Drives, motors, belts, bearings, pulleys and all other conveyor components must be sized utilizing 0.4 kN/m live load.
- 27.7.8 The motor must be able to operate at 25% overload for a period equal to the time required to run the belt from the charge end to the discharge end.
- 27.7.9 Conveyor steady state motor current draw must not exceed motor nameplate rating when operating with design loads.

## 27.8 EQUIPMENT FINISHES

- 27.8.1 All elements within the passenger areas should be manufactured from, and clad with Stainless-Steel: AISC Type 304 with #4 Brush Finish or approved equivalent
- 27.8.2 Cover all metal components and surfaces of conveyors and shutter door trims in public view with stainless-steel. stainless-steel shall incorporate smooth flush edge seams. Radius type edges are not acceptable
- 27.8.3 All stainless-steel trim elements and related connections are to be smooth, aligned and flush without openings or projections.
- 27.8.4 All flat head screws used to attach the stainless-steel shrouding, such as the horizontal portions attached to the conveyor bed, are to be completely countersunk so that no portion of the screw head is above the adjacent surfaces. Such flat head screws are to be of the Phillips Head type. Grinding or filing of the screw heads to accomplish the above is not acceptable.
- 27.8.5 Field welding of any stainless-steel trim element is not acceptable. Additionally, no blemishes of the stainless-steel trim elements shall be accepted. This includes those blemishes that are caused by poor manufacturing practices as well as those caused in the field plus those caused by field attempts to remove any blemish.
- 27.8.6 All other conveyor and associated equipment, which is located inside the Terminal building is to be painted as described below. The suggested colours according to its function and location are as follows and should be mutually agreed during the Design Phase:
- Conveyors on level 2 screening section Orange
  - Conveyors in level 3 area Red
  - Other Departure conveyors Grey (to match existing)
  - Arrivals conveyors Grey (to match existing)
  - Walkways on escape routes Yellow
- 27.8.7 Protect all other unfinished surfaces (shafts, slider beds, etc.) with a suitable rust inhibitor during shipping and installation.
- 27.8.8 All finishing shall be done off-site at a professional paint or powder coating track. On-site finishing activities shall be limited to touch-up paint.
- 27.8.9 Prior to the application of any finish, clean all surfaces to be free of dirt, grease, oil, flux, flash metal, spatter metal, sand, rust, scale, or oxides, and all other debris that might interfere with the effective application of the finish. Clean surfaces immediately before the finishing operation. Ensure cleanliness during the period (which shall be of minimum duration) between cleaning and other finishing processes. For galvanization use a compatible chemical solution such as phosphoric metal etches for rust inhibitive wash.
- 27.8.10 Chemically degrease (e.g. with a solvent cleaner or phosphate solution), rinse and let dry all surfaces to be painted or electrostatic power coated or galvanized.
- 27.8.11 Electrostatic Powder Coating is preferred finishing methodology to wet painting, due to its superior quality and resistance to the elements.
- 27.8.12 Apply the powder coating according to the powder supplier's specification with a minimum thickness of 50 microns or more as needed to obtain proper coverage.
- 27.8.13 After the application of the powder the parts shall be cured in an oven according to the powder supplier's specifications.
- 27.8.14 Should the Supplier offer a wet paint solution, then they should apply primer and enamel to provide a surface of high quality appearance free from runs, sags, cracks, flaking, peeling, blushing, or other defects which may affect drying characteristics, durability, and appearance of the painted surfaces. Apply primer and enamel by brushing, spraying, or dipping.

- 27.8.15 Prime and finish paint all catwalks, stairways, ladders, maintenance platforms and support steel.
- 27.8.16 Do not obscure equipment nameplates, identification plates, or other identifying markings when painting the equipment. Whenever possible, apply the plates and markings after painting. In all cases where they cannot be applied after painting, mask or otherwise protect them to retain their legibility. After painting, thoroughly and effectively remove all masking and protective coatings.

## 28 DESIGN COORDINATION AND DESIGN REQUIREMENTS

### 28.1 GENERAL

28.1.1 Provide sufficient personnel for the purpose of coordination to ensure timely completion of the BHS Design and to ensure that the work of other trades is not hindered. Personnel must have appropriate experience for coordination at meetings to facilitate coordination decisions during coordination meetings.

### 28.2 ON-SITE INSPECTIONS

28.2.1 Certain portions of this project require the modification, interfacing with, removal and demolition of existing conveyor equipment. Carefully coordinate this work with the Buyer where the works have the potential to affect existing operations.

28.2.2 Conduct thorough field checks of the existing conveyors and their relationship within the existing system as well as their relationship with the configuration of the specified system and the ongoing operations.

28.2.3 Conduct thorough field inspections of the as-built condition of the facility as it becomes available and to identify to The Buyer any discrepancies with the facility design documentation within 10 days of the facility being available for such inspections.

### 28.3 PROVIDE APPROPRIATE ACCESS

28.3.1 Ensure that the design and installation of all conveyor equipment provides appropriate access for operation and maintenance personnel.

28.3.2 Coordinate the location of any equipment provided by others that mounts on or interfaces with the BHS such as, but not limited to FIDS/BIDS screens at make-up and reclaim carousels, BIDS screens and first/last bag keypads at reclaim inputs, security swipe card readers at fire/security doors. Ensure that the location and mounting method of such equipment does not interfere with the operations and/or maintenance of the equipment. The coordinated location of such equipment must be shown in the typical interface drawings.

### 28.4 INTERFACE WITH BUILDING STRUCTURE

28.4.1 Calculate the loads onto the building structure resulting from the dead loads of the BHS equipment, walkway and support structures and the live load of baggage and maintenance personnel and provide the resulting loads for review.

28.4.2 Design the support system such that the loads allowed for the BHS in the building structural design are not exceeded.

28.4.3 Mount all conveyor components on vibration isolators to minimize vibration from being transmitted to the building. There must be no perceivable vibration transmitted from the BHS to the building in public areas and/or office spaces. There must be no objectionable vibration transmitted from the BHS to any other areas of the building.

28.4.4 Types and sizes of vibration isolation devices must be determined based on individual support loads, vibration frequency and vibration amplitude so that appropriate vibration isolation is provided.

28.4.5 Ensure that all National, State, and Local codes for seismic requirements are followed and that equipment is installed accordingly.

### 28.5 PERSONNEL SAFETY

- 28.5.1 The operation of the system must be convenient and safe to use, and control functions required to be performed must be simple to minimize possible errors. Provide convenient means for emergency shutdown of the system.
- 28.5.2 Provide adequate means for ensuring the safety of all personnel who have access to the system.
- 28.5.3 Prepare and submit a safety plan and safety procedures manual.
- 28.5.4 Provide sufficient safety signage throughout the system. Such safety signage must include horizontal and vertical routing signs within the BHS walkways for emergency evacuation of personnel that must be visible during any lighting condition. For all other signage, provide safety signage that is visible during illuminated conditions.
- 28.5.5 Provide lockable devices such as disconnect switches and lockouts at all MDB, MCP's, DCP's, and any other electrical panel to prevent the accidental activation of those portions of the system that have been shut down for maintenance.
- 28.5.6 Provide equipment and component guards at all locations where personnel may be exposed to moving parts that have the potential to cause injury.
- 28.5.7 Provide sufficient workspace in all limited access areas. Provide walkways and access platforms with safety handrails and toe boards to ensure clear access for maintenance staff (with appropriate tools and/or replacement parts) to all equipment at levels inconvenient for maintenance from the floor.
- 28.5.8 Where platforms are overhead of conveyors or staffed areas, provide adequate protection to prevent objects such as hand tools or parts from falling between the platform gratings.
- 28.5.9 Provide audible and visual warning signals along all areas of the system to make apparent any potential hazards to the public, operating and/or maintenance personnel resulting from equipment that is about to start.
- 28.5.10 Provide protection from falling objects in work areas or aisles located beneath overhead portions of the system with gap pans, netting or similar to catch falling objects.
- 28.5.11 Locate conduits and all other electrical components where they are not subject to damage by maintenance or operational personnel and where they do not interfere with maintenance access.

## 28.6 SYSTEM SAFETY

- 28.6.1 Design, manufacture, supply, install and construct the BHS in accordance with all of the stated requirements, and meet or exceed all applicable laws rules, orders, regulations and codes. Notify The Buyer in writing any changes in such laws, rules, orders, regulations or codes which may result in or has resulted in an unsafe condition(s). Rectify any such condition(s) as quickly as practical.
- 28.6.2 Utilize control methods and techniques, circuitry, mechanical and electrical equipment and operating/maintenance procedures to provide maximum safety for operation and maintenance personnel and to minimize potential damage to the equipment and to the baggage being processed. Incorporate fail-safe techniques to prevent the occurrence of unsafe conditions, which could result from an equipment failure or improper implementation of the operating procedures such as, but not limited to fail safe emergency stop controls and fire door activation circuits.
- 28.6.3 As employed herein, the failsafe principle shall be interpreted as follows: In the event an equipment failure or external influence such as improper operation, high temperature, power failure, or other adverse condition affects the proper function of a system or element involved with the safety of life or health, said system or element must revert to a state known to be safe to all personnel and public interfacing with the equipment.

## 29 MAINTAINABILITY

### 29.1 DESIGN OF THE COMPONENTS

- 29.1.1 The requirements set forth in this section are minimum requirements and do not relieve the obligation to provide a system in which all required maintenance tasks can be readily performed.
- 29.1.2 Design the system so that equipment components requiring inspection and servicing are readily accessible. Provide suitable doors and/or access openings for this purpose. Where necessary, provide access holes in frames or guards, but keep them to a minimum number and size, and ensure that they do not create protrusions or discontinuities detrimental to the baggage being conveyed.
- 29.1.3 Design equipment to facilitate maintenance functions in preference to ease of fabrication.
- 29.1.4 Design equipment such that, whenever possible, assemblies shall not require dismantling in order to troubleshoot, repair or replace assemblies or components of assemblies involved in such servicing procedures.
- 29.1.5 Affix cover plate attachment hardware to, or hold captive in, the cover plate assemblies. Provide loose parts other than common hardware with identification markings that relate them to their respective assemblies.
- 29.1.6 Provide all electric assemblies, panels, or boxes with the appropriate schematic, enclosed in a clear-faced envelope affixed in a location visible to personnel while servicing such items.
- 29.1.7 Provide at least one set of any specialty tools necessary to maintain the system. Provide additional tool sets if required to properly maintain the System. Tools shall be considered specialty tools if they would not be normally present in a conveyor mechanics tool box. These tools must be provided in a metal toolbox with identification of the Specialty Tool Set number. Tools within the toolset must be individually labelled with their corresponding tool set number.
- 29.1.8 Provide fixed or mobile ladders, service platforms, lifting lugs or other applicable provisions to ensure easy access to components requiring servicing, either as shown on the specification drawings or as required to assure a safe and efficient system for all personnel who operate, maintain or have access to it.

### 29.2 MAXIMUM MAINTENANCE TASK TIMES

- 29.2.1 Design all components so they can be easily disconnected and removed from the equipment without the necessity for extensive disassembly. Design all equipment so that any maintenance task can be accomplished two (2) maintenance staff in a period not to exceed one (1) hour. Removal and replacement of electrical components must be able to be accomplished within 15 minutes. Be prepared to demonstrate that any maintenance task, not so listed, can be accomplished within the maximum allowable time. Correct any installation, without charge, as required to accomplish this demonstration.

### 29.3 AVAILABILITY OF CONSUMABLES AND REPLACEMENT PARTS

- 29.3.1 Maintain, for immediate dispatch, an adequate inventory of spare parts (especially long lead time and operational critical items) required for routine and emergency maintenance of the equipment and systems. Ensure that critical spare and replacement parts required by the system are made available for a minimum of a ten (10) year operational period through the availability of shop and As-Built drawings and through the availability of the actual parts. Additionally, ensure the availability of custom or "special" components whether or not of direct or third-party manufacture for a minimum period of ten (10) years.
- 29.3.2 If such parts are not available from the Supplier during the ten (10) year operation period or should pricing become unreasonably high on a competitive basis, the Buyer has the right to permit the use of third-party drawings for fabricating such parts, or having such parts fabricated so as to maintain the system.

- 29.3.3 For non-proprietary parts, list at least two suppliers for each part and list at least one other acceptable alternate part for each part that is compatible and has equal functionality from different manufacturers/suppliers.

## 29.4 LIFESPAN

- 29.4.1 Provide equipment components and items for a system equipment life of a minimum of 10 years based on an operating duty cycle of 20 hours a day, 365 days per year except for high level control network and server equipment which must have a minimum equipment life of 7 years and an operating duty cycle of 24 hours a day, 365 days per year starting from Notice of Operation Completion. This provision is a design requirement, not an implied warranty.
- 29.4.2 All equipment must be designed and installed to handle typical baggage expected at the project site at the above stated operating duty cycle.
- 29.4.3 Notify the Buyer if parts are expected to be replaced within the 10-year lifecycle. Unless otherwise notified, the Buyer shall not expect to replace parts or components of any equipment within 10 years. This expectation does not apply to abnormal conditions such as breakage caused by baggage jams, out of tolerance baggage, inappropriate use and force majeure.

## 29.5 COMPONENT STANDARDIZATION AND INTERCHANGEABILITY

- 29.5.1 Minimize the number of different types and makes of components used in the BHS to simplify spare part inventory including for equipment provided by different sub-suppliers.
- 29.5.2 Design all equipment and components to definite standard dimensions, tolerances, and clearances to provide maximum inter-changeability. Any future design development required to resolve design faults or improve and enhance equipment performance or capability must be backwardly compatible without the need for material or wholesale change to the components that comprise the equipment installed and the manner in which they operate.
- 29.5.3 Provide like types of equipment from the same manufacturer whenever practicable.

## 29.6 NAMING CONVENTION (EQUIPMENT IDENTIFICATION)

- 29.6.1 Follow the existing Airport BHS equipment naming convention and modify or expand this convention if needed to cover the extent and detail of the Scope of Work.
- 29.6.2 The Supplier may propose their own equipment naming convention for review and acceptance; however the Buyer shall not obligate to accept the proposed convention in which case the established naming convention must be followed.
- 29.6.3 The item numbering system and format used for physical identification of new and modified equipment and in all documentation must be consistent with the subsystem identification defined in the existing naming convention or other approved naming convention. The equipment must be numbered in consecutive order.

## 30 CODES AND STANDARDS

### 30.1 REGULATIONS

30.1.1 All equipment and workmanship shall be in accordance with all relevant Standards, Codes and Statutory Authority Acts and Regulations applicable to the Scope of Works and as listed in this section. Where conflict exists between codes, standards or regulations, written clarification shall be requested from the Buyer. If works and/or materials are not covered by codes or standards, clarification must be sought from the Buyer. The Supplier shall not deviate from the provisions of the relevant standard without first obtaining agreement in writing from the Buyer. The Supplier shall apply the latest issue of the applicable Standards, Codes and Statutory Authority Acts and Regulations to the Scope of Work

### 30.2 IATA STANDARDS

- IATA Passenger Services Conference Resolutions Manual.
- IATA Airport Development Reference Manual
- IATA Recommended Practices
- Res 706
- RP 1706
- RP 1740 a
- RP 1740 b
- RP 1740 c
- RP 1740 d
- RP 1745
- RP 1797

### 30.3 ICAO STANDARDS

- ICAO annex 17, Safeguarding International Civil Aviation Against Acts of Unlawful Interference
- ICAO 8973, Security Manual for Safeguarding Civil Aviation Acts of Unlawful Interference

### 30.4 INTERNATIONAL STANDARDS ORGANISATION (ISO)

- ISO 11801, Information technology. Generic cabling for customer premises
- ISO 9001; Quality Assurance in Design/Development, Production, Installation, and Servicing
- ISO 9003; Quality Assurance in Final Inspection and Test
- ISO 9004; Quality Management and Quality System Elements Guidelines
- ISO 2631-2 Mechanical vibration and shock, Evaluation of human exposure to whole-body vibration, Part 2: Vibration in buildings (1 Hz to 80 Hz).
- ISO 12944 Paints and varnishes – Corrosion protection of steel structures by protective paint systems
- ISO 4628; Paints and varnishes -- Evaluation of degradation of coatings.
- ISO/IEC 15026; Information Technology – System and Software Integrity Levels.
- ISO 340: Conveyor Belts: Flame Retardation
- UL94: Plastics Flammability Standard

### 30.5 EUROPEAN STANDARDS

- ISO 13849-1; Safety of machinery Safety-related parts of control systems - Part 1: General principles for design
- ISO 13849-2; Safety of machinery Safety-related parts of control systems - Part 2: Validation
- ISO 13850; Safety of machinery Emergency stop -- Principles for design
- ISO 61131 Programmable logic controllers
- ISO 7671 IET Wiring Regulations
- ISO 61508 Functional safety of electrical / electronic / programmable electronic safety-related systems.
- ISO 14119; Safety of machinery. Interlocking devices associated with guards

- ISO 14122-1 Safety of machinery – Permanent means of access to machinery – Choice of a fixed means of access between two levels
- ISO 14122-2 Safety of machinery – Permanent means of access to machinery – Working platforms and walkways
- ISO 14122-3 Safety of machinery – Permanent means of access to machinery – Stairways, stepladders and guardrails
- ISO 14122-4 Safety of machinery – Permanent means of access to machinery – Fixed ladders
- ISO 14122-1 +A1:2010, ISO 14122-2:2010 , ISO 14122-3 +A1:2010, ISO 14122-4:2004+A1:2010 – Steelwork, platforms and walkways standards
- IEC 60364-4-41 Protection for safety – Protection against electric shock

### 30.6 KAUNAS AIRPORT STANDARDS

- 30.6.1 The Supplier is responsible for obtaining and ensuring compliance to all Airport specific internal standards and standard operating procedures. examples provided below:
- Requirements for service provision in the airport:  
<https://www.ltou.lt/lt/apie-lietuvas-oro-uostus/tvarkos-ir-dokumentai/dokumentai-paslaugu-teikejams>.  
Requirements for permissions:  
<https://www.ltou.lt/lt/galimybes-verslui/leidimai>
- 30.6.2 The Supplier must make themselves familiar with all safety and internal operations rules in Kaunas airport (These will be provided after Contract is awarded).
- 30.6.3 The Supplier must follow all National rules for welding, labor security, fire safety, electronic installation, radiation all other relevant National or EU rules that are related with services provided.

## 31 EQUIPMENT SPECIFICATIONS

### 31.1 CONVEYOR EQUIPMENT

#### 31.1.1 General

31.1.1.1 All equipment must be of Metric dimensions.

31.1.1.2 Unless otherwise specified on drawings, construct conveyors to the following dimensions:

- Belt width 950mm – 1,000mm
- Between sidewalls 1,000mm – 1,050mm
- Overall frame width 1,100mm – 1200mm
- Belt curve inner radius min 1,000mm
- Queue conveyor length, preferred (IG) 1,200-1,300mm
- Queue conveyor length, preferred (OOG) 2,500-3,000mm
- Max queue conveyor length 3,000mm
- Max transport conv length 15,000mm

31.1.1.3 All inclined and declined conveyors must have a maximum slope of 15 degrees for non-tracking conveyors and 7 degrees maximum for tracking conveyors, unless otherwise indicated on drawings. In all cases, where space permits a lower angle, minimize the slope utilizing the least possible incline/decline angle to achieve the proper elevation change.

#### 31.1.2 Belt Material

31.1.2.1 All conveyor belts used must be Flame Retardant according to ISO 340.

31.1.2.2 Belt widths must be 20-50 mm less than the between frame (guard) dimension.

31.1.2.3 Ensure that no belt slippage occurs in order to meet all tracking performance requirements.

31.1.2.4 The Supplier must replace belts and split conveyors appropriately where merges, diverters or discharges are shown connecting to existing conveyors.

31.1.2.5 The Supplier must submit a conveyor schedule listing belt types.

31.1.2.6 Belts should be made up of a 2-ply polyester urethane impregnated carcass, PVC upper minimum 0.5mm thick, plus a urethane impregnated bottom.

31.1.2.7 Smooth top belts should be used on general transportation belts and belt curves.

31.1.2.8 Low friction top belts should be used on merge type receiving conveyors and collector conveyors.

31.1.2.9 Longitudinal groove high friction top belts should be used on incline/decline conveyors and spiral above 7 degrees.

31.1.2.10 Metering and queue type conveyors may use a combination of belts depending on function.

31.1.2.11 All belt joints must be vulcanized on site or supplied as endless, hot-overlap finger splice joints, as per the manufacturer's requirements. Only one joint or splice is permitted per belt.

31.1.2.12 Removable side guards must be provided on all conveyors (at a nominated location) to allow for on-site positioning of a hot splicing machine or lacing machine, except on check-in feed conveyors, which must be removable from their position and disassembled for belt replacement.

31.1.2.13 For power turns, new belting must be spliced prior to installation and installed as per manufacture's recommendations.

### 31.1.3 Motors:

- 31.1.3.1 Motorised pulleys are not acceptable for transport nor queue conveyors and will only be considered for check-in conveyors.
- 31.1.3.2 The conveyors must be driven by AC induction motors. The motors must conform to IEC or other equivalent standards.
- 31.1.3.3 Motors must be sized for maximum load and belt speed requirements under continuous operation and, where applicable, must be capable of withstanding shock caused by frequent starting and stopping under full load conditions. Motor FLA will be measured with full load during load tests and any motor that draws more than the name plate FLA (after start up in rush current has flattened) must be replaced with a motor of appropriate size that will result in no more than the max name plate FLA during load test.
- 31.1.3.4 Motor protection must meet minimum IP54 requirements.
- 31.1.3.5 If bag overrun is critical to meet System Performance parameters, motors should be equipped with automatically applied brakes or VFD's to prevent overrun after the motors are de energized.
- 31.1.3.6 Drive units must be rated for a minimum life of 50,000 hours prior to the requirement for rebuilding.
- 31.1.3.7 All motors must be of IEC IE4 "high efficiency and low energy" type.
- 31.1.3.8 For Removable conveyors (e.g. EDS device in feed and exit conveyors) motors must be equipped with heavy-duty quick couplings for electrical connections
- 31.1.3.9 Motors should be fitted with low noise fan reduction guard or equivalent.
- 31.1.3.10 Motor size selection must be based on the design load and friction coefficient requirements as described in these specifications.
- 31.1.3.11 All drive motors must be provided in standard sizes between 0.55 kW minimum and 4.0 kW maximum except for check-in feeder conveyors where smaller motors down to a minimum of 0.37 kW are permissible.
- 31.1.3.12 Size conveyor equipment drive motors to permit start-up under full load conditions at the specified frequency of start-up cycles per minute without exceeding a temperature rise of 68°C based on an ambient temperature of 40°C.
- 31.1.3.13 Provide motors designed for 3Φ 415 V 50 Hz operation.
- 31.1.3.14 All incline and decline conveyors (Over 5 degrees) drive units must be equipped with a brake.
- 31.1.3.15 All brake discs must not contain any asbestos material.

### 31.1.4 Gearbox reducers

- 31.1.4.1 All reducers must be mounted in the horizontal or vertical plane; they must not be mounted such that they are angled to follow the inclination of the conveyor.
- 31.1.4.2 Gearboxes must be sized for a Class II application (minimum). Based on actual motor power, the service factor required to obtain an L10 life of 70,000 hours of operation under full load condition.
- 31.1.4.3 For reducers a minimum service factor of 2.4 is to be used.
- 31.1.4.4 Gearboxes must have adequate provisions for drain, fill, inspection ports and sight gauge. All units must be installed with proper lubrication and vent plugs intact upon start-up of conveyor.
- 31.1.4.5 Gearboxes used on inclines above 7 degrees where roll back would be critical must be equipped with "backstop" devices or brake motors.

### 31.1.5 Conveyor Sidewalls (side guards)

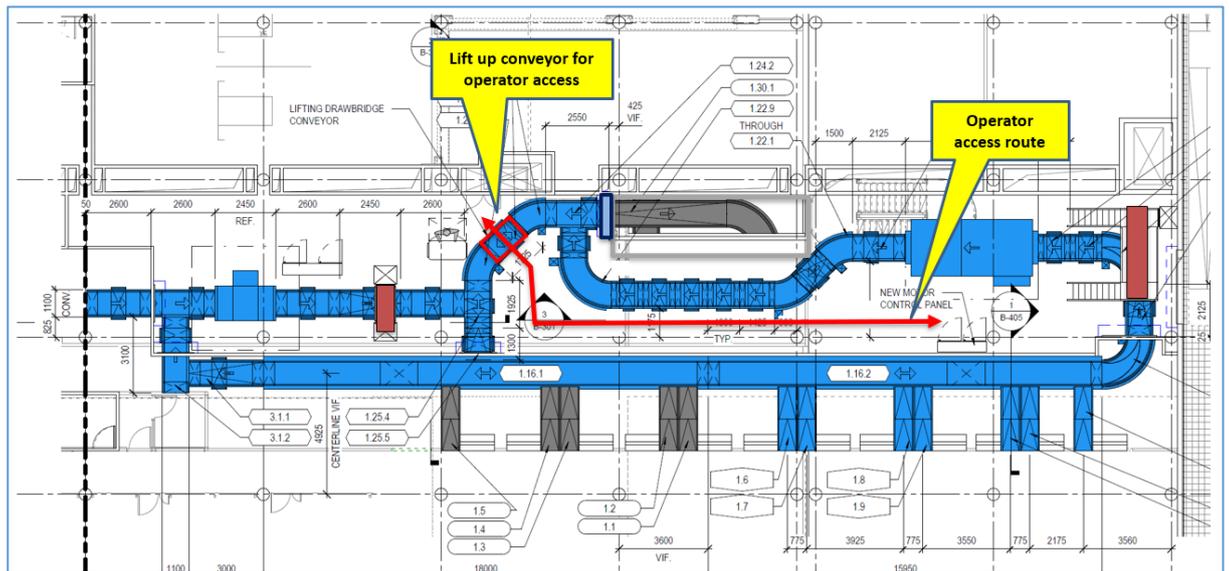
- 31.1.5.1 Provide and install side walls the full length of both sides of all conveyors except at points that baggage is loaded or removed.
- 31.1.5.2 Provide a removable section of side wall on each conveyor which allows for the placement of a hot vulcanizing machine for belt joining.
- 31.1.5.3 Provide hinged or removable sections only where overhead clearance restricts access for clearing jams.
- 31.1.5.4 Side walls must be minimum 2.0 mm hot rolled steel, integral to or fixed directly to the slider bed. The top of the side walls must incorporate formed upper edges turned away from the conveyor and without any sharp edges. There must be no gap between the side guard and bed section that can cause jams or baggage tags to be snagged/ripped off.
- 31.1.5.5 Provide side walls with vertical stiffeners at maximum of 1500 mm centres. Design and install the side guards so that the leading edge of a side guard panel does not extend into the path of moving baggage. Filler material may not be used to correct side guard protrusions.
- 31.1.5.6 Extreme care is to be used in the design and installation of the side guards at the point of intersection with conveyor security doors. This interface point must not act as a snag/catch point for baggage or baggage tags. Conveyor side guards must be flared on the downstream side of any intersection with security doors.
- 31.1.5.8 Provide 30-degree transition panels between side and back guards of different heights.
- 31.1.5.9 Unless otherwise indicated in the drawings, minimum sidewall heights are as follows:
- General Transport conveyors and queues min 300mm
  - Incline/decline conveyors and queues min 300mm
  - Belt curves and spirals min 300mm
  - Loading conveyors (load side) min 25mm, max 50mm
  - Loading conveyors (far side) min 300mm
  - Operator positions (eg man code, IQT etc) min 25mm, max 50mm
- 31.1.5.10 Photocell and reflector holes in sidewalls should be kept to a minimum size and located at a suitable height to detect baggage. Punch the holes with a dimple away from baggage flow to minimize the possibility of snagging a bag and causing a jam. All sharp edges to be deburred. Unused photocell holes must not be acceptable and must be plugged with a welded circular steel piece, ground smooth and repainted.
- 31.1.5.11 Mounting of any mechanical or electrical equipment on the outside radius side guard of power turns is not accepted since it restricts maintenance access. Where this cannot be avoided e.g. mounting of photocell reflectors, ensure that it does not restrict maintenance access to the unit.
- 31.1.5.12 Side guards are not to be lapped and must be properly aligned.
- 31.1.5.13 At locations where there are low or no side guards along one or both sides of a conveyor there must be a pressure sensitive device mounted between adjacent end pulleys that is interlocked with the E-Stop system to stop the conveyor if activated. Examples include load and unload conveyors, conveyors at manual encoding, conveyor at IQT input/output etc

### 31.1.6 Queue Conveyors

- 31.1.6.1 Supply queue/metering conveyors of the manufacturers standard approved design capable of sustaining continuous stop/start operation of minimum thirty (30) cycles per minute under loaded conditions.
- 31.1.6.2 Design the queue conveyors so that trained maintenance personnel can easily accomplish belt tracking.
- 31.1.6.3 Design of the queue conveyor must be so that adjustments to belt tracking should only be required at a maximum of once every thirty (30) days.
- 31.1.6.4 Design, manufacture and installation of queue/metering conveyors must be in accordance with the design specifications of transport conveyors.
- 31.1.6.5 Queue conveyors must be a minimum of 1200 mm in length for all standard bag systems.

### 31.1.7 Lifting Drawbridge Conveyor

- 31.1.7.1 The queue conveyor that is used as the level 3 manual interface position shall be capable of being raised via a pivot arrangement to allow Operator access to the Standard 3.1 EDS machine, generally as follows:
- 31.1.7.2 The conveyor will be based on standard queue conveyor design, as described above, and will include



- safety features suitable for use as a manual interface position.
- 31.1.7.3 Should the operator need to attend the EDS machine e.g. to carry out IQT testing, attend to bag over-length or over-height alarms, or maintenance access, then it should be possible to stop the bag flow and raise the conveyor as a draw bridge to allow access through.
- 31.1.7.4 Pushbutton stations, located either side of the conveyor, should allow the operator to stop/start the flow of bags to level 3. Cleared bags may still be routed to make-up, however any bags needing to be routed to level 3 or recirculated back to the EDS machine must stop at the switching T junction until the operator re-starts the line.
- 31.1.7.5 The operator should ensure the level 3 conveyor is clear of all bags before raising the drawbridge lifting conveyor.
- 31.1.7.6 The lifting conveyor shall pivot from the up-stream side of the conveyor and shall be no less than 800mm wide between closest obstructions. The opening shall be free of snag points.
- 31.1.7.7 The lifting conveyor shall incorporate appropriate counterbalances and/or gas springs to reduce the lifting force required such that one man can easily lift and lower the gate.
- 31.1.7.8 The lifting conveyor section shall have a spring-loaded catch that allows the conveyor to be locked in the upright and the horizontal position. The release of the catch shall be designed such that the release is not accidentally activated. It should be possible to activate the catch from either side of the conveyor.
- 31.1.7.9 The counterbalance and/or gas springs shall ensure that the hinged conveyor section does not "slam" down into its home position when the catch is released.
- 31.1.7.10 Sideguards at locations of hinged walk-through passage conveyor sections shall be appropriately designed to prevent bag jams and guillotine situations causing unsafe conditions.

### 31.1.8 Belt Curves

- 31.1.8.1 All belt curves must be provided with a minimum 1000 mm inside radius for standard conveyors and 1500 mm inside radius for OOG conveyors, unless otherwise noted on the contract drawings.
- 31.1.8.2 All belt curves turn frames, including slider bed, must be fabricated of steel or aluminium.
- 31.1.8.3 Limit belt curve turn angles to 45/60/90-degree selections unless otherwise approved by the Buyer.
- 31.1.8.4 Ensure that slip between pulleys and belt does not occur especially in the areas of reversible conveyors.
- 31.1.8.5 Ensure that the outside circumference side guard must remain readily removable for maintenance. Do not attach conduit, cable tray or other permanently attached equipment to the outside side guards.
- 31.1.8.6 Design the belt curve equipment and location so that belts can be replaced with minimum effort and skill. The Supplier must be able to demonstrate the replacement of the belt within 30 minutes using 2 technicians, on site, if requested.

- 31.1.8.7 Drive assemblies, bearings, pulleys and similar equipment must be designed as per straight conveyors detailed within this section of the specification.
- 31.1.8.8 If chain attachment to power turn belting is used, these chains must be fitted with automatic lubrication devices.
- 31.1.8.9 Drive unit must be of the shaft mounted type.
- 31.1.8.10 The conveyor belt must be guided by means of nylon beading, chain, or other hard-wearing material and running on precision roller bearing guides or chain attachment to belting.
- 31.1.8.11 Belt speed must be measured on the belt centreline.
- 31.1.8.12 A power turn of 45 degrees or more may be used as a queue conveyor, if equipped with a suitable drive and controls and queuing capability with a maximum length bag is demonstrated.

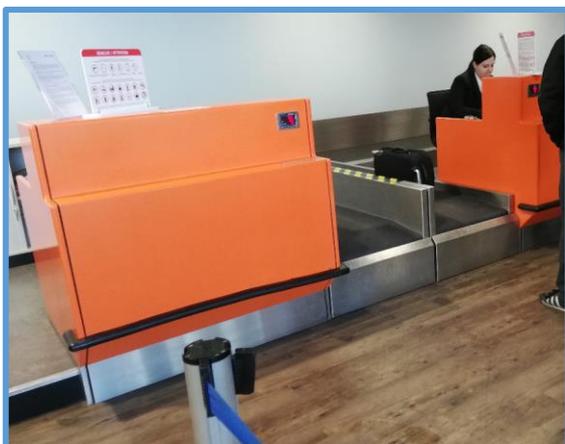
31.1.9 **Spiral Belt Curves**

- 31.1.9.1 All requirements for belt curves also apply to spiral turns. This section defines additional requirements specifically for spiral turns.
- 31.1.9.2 The incline or decline of spiral turns must be limited to no greater than 150 mm per 45° of turn but must be kept to a minimum whenever possible.
- 31.1.9.3 Ensure the procedures recommended by the manufacturers for installation and support are followed prior to removal of the shipping frame for spiral turns to avoid damage to the equipment

31.1.10 **Check-in Conveyors**

- 31.1.10.1 The 10 existing check-in conveyors, weigh scales and desks will be re-used, and in some cases repositioned within Kaunas Airport.
- 31.1.10.2 The Supplier is to supply 2 off new check-ins and weigh scales and they should reasonably visually match the existing design and dimensions. Dimensions of new check-in may be within ± 5% tolerance. The Supplier should measure the existing units, although approximate dimensions and photographs are as follows:

- Belt width 660mm
- Inside sidewalls 675mm
- Outer frame width 780mm
- Feed height, passenger end 330mm
- Sidewall heights 100/300mm
- Weigh/Label conv length 1300mm
- Despatch conv length 1300mm



- 31.1.10.3 Each position shall consist of a Weigh/Label and Despatch conveyor.
- 31.1.10.4 Check-In counter conveyors shall be designed to be capable of start/stop operation at a rate of 15 cycles per minute without experiencing excessive heat build-up or wear on any components.
- 31.1.10.5 Minimum drive size is 0.37 kW motors in this application, provided such design complies with the specifications identified elsewhere in this document.
- 31.1.10.6 Provide the Weigh/Label conveyor belting with a smooth top belt, and the Despatch conveyor with a diamond pattern profile, similar to the existing.

- 31.1.10.7 The scale conveyor's passenger side shall be appropriately shrouded to prevent injury to the passenger. This shroud shall be a minimum of 2.0 mm thick and designed to avoid indentation under normal working conditions
- 31.1.10.8 The conveyors shall be mounted on a rail system with lead-in chamfer that allows for removal and re-insertion of the check-in conveyors by a single maintenance person without powered lifting tools. There shall be a minimal gap between the rail and the finished floor to ensure a smooth transition of the wheels from the rail to the finished floor.
- 31.1.10.9 The tail end wheels shall be casters and the head end wheels shall be fixed. The wheels of the equipment shall not leave marks on the finished floor.
- 31.1.10.10 Shroud all check-in counter conveyors in type 304 stainless steel with #4 brushed satin finish uniform throughout, unless otherwise specified by the Owner.
- 31.1.10.11 Side guards for the weigh/label shall closely match the existing check-ins.
- 31.1.10.12 Head and tail pulleys must be short faced and the gap between the ends of the pulley and side guards made good with a static shroud to the profile of the pulley. The shroud must be wide enough such that the moving surface of the pulley cannot become exposed under normal operating conditions.
- 31.1.10.13 Provide a physically identifiable marker on the inside of the scale conveyor side guard (at the head end) for the check-in operator to manually identify over-length bags.
- 31.1.10.14 The Despatch conveyor shall be designed to be capable of toppling all bags into a stable position when the bag is transferred on the Collector conveyor.
- 31.1.10.15 A large diameter stainless steel turning cone or other mechanism shall be provided at the discharge end of the dispatch conveyor to facilitate the right-angle transfer and to topple large bags standing upright. The dispatch conveyor shall not cause baggage items placed in a tub to fall out of the tub. Since the collector conveyor is bi-directional, topplers will be needed in both directions of flow.
- 31.1.10.16 Degradation of system performance, such as baggage jams, runaway bags on declines, tracking problems, and the like shall not be acceptable as a result of failure of the bag tipping devices to perform their intended function. Performance will be reviewed during testing. Final performance of the prototype will be measured with live baggage.
- 31.1.10.17 Obtain the approval and certification of all applicable local, state, municipal, Airport, and all other governing authorities for the scales.
- 31.1.10.18 The scale conveyor shall be certified for revenue collection purposes.
- 31.1.10.19 The digital displays shall indicate the weight in kg for both individual bag weight and running total baggage weight simultaneously. Display the weight of each bag on each of two panels: One in full view of the passenger and the other grouped with the controls behind the counter.
- 31.1.10.20 The digital displays shall be housed in the operator's console, along with the scale readouts and all check-in counter conveyor controls.
- 31.1.10.21 A display range of 0-150 kg in 0.1 kg increments shall be provided on both display panels at all check-in counter positions. In addition, provide the capability to accumulate weights for successive pieces of baggage. If the total maximum allowable weight is exceeded, the display shall show a fault condition on the passenger side. Otherwise, the total weight shall be displayed on both the operator and passenger side. Overweight setting shall be adjustable. Once bags are removed, the setting shall automatically reset to zero.
- 31.1.10.22 Operator control panels shall be provided at each check-in position.
- 31.1.10.23 It shall be acceptable to use motorized pulleys in this application, provided such design complies with the specifications identified elsewhere in this document. They shall not use PVC or other synthetic gear trains.
- 31.1.10.24 Provide a photocell at the head end of the Weigh/Label and Despatch conveyor segments.
- 31.1.10.25 A single plug for power and a single plug for control connections shall be provided to facilitate the removal of equipment.
- 31.1.10.26 Provide a cable management system under the equipment to ensure the equipment can be removed and installed without damaging or tangling up of the cables, connectors or the equipment.
- 31.1.10.27 The weigh scale shall send an "inhibit" signal to the BHS to inhibit activation of the scale conveyor when a bag exceeds the maximum bag weight. The maximum bag weight shall be configurable and initially set at 32 kg.

## 31.2 FLAT TYPE RECLAIM CAROUSELS

### 31.2.1 General

31.2.1.1 The carousel shall be constructed of articulating, overlapping, heavy duty, rubber or PVC slats forming a continuous rotating flat surface.

### 31.2.2 Dimensions

31.2.2.1 The usable slat width for the carousel shall be between 900mm and 1,000mm.

31.2.2.2 The conveying height shall be between 380mm and 450mm.

### 31.2.3 Load Rating

31.2.3.1 The carousel shall be capable of supporting a minimum dynamic load of 150kg per linear meter and a single concentrated static load of 100kg.

### 31.2.4 Operating speeds

31.2.4.1 Carousel operating speed to be in the range 27 to 30 m/min.

31.2.4.2 Carousel shall be capable of accepting a baggage input of thirty (30) bags per minute.

### 31.2.5 Drives

31.2.5.1 The units shall have friction type drives, with appropriate self-adjusting spring-loaded activation.

31.2.5.2 Each drive shall be equipped with an appropriately sized electronic soft start / soft stop device to ensure smooth start-up / shut down of the device. In lieu of a soft start, a variable frequency controller may be used for each drive.

31.2.5.3 The design of the drive circuitry shall be such that the drive motor safety disconnect switch will also open the control circuitry of the device whenever the disconnect switch is turned off. Whenever the disconnect switch is turned back on, it shall be required to reactivate the appropriate device start controls, thus allowing the drive motor start-up to be controlled by the soft start controller.

31.2.5.4 A minimum of one drive units is required. The Supplier shall provide additional drives if necessary, to meet the load rating, size and carousel shape.

31.2.5.5 The carousel and drives shall be designed and configured such that if one of the drive units should fail, the device shall continue to operate at 75% capacity including the ability to start-up under full load conditions with the remaining drives.

31.2.5.6 Easy access and means for disconnecting failed drive unit shall be provided to allow for system maintenance with a minimum of time and effort. The drives shall be designed such that failed drives can be disconnected in 15 minutes by a single technician.

31.2.5.7 Drive design and motor applications must provide for the potential of variations in actual motor speeds so that the drive motors are equally loaded. The motor used in the dual drive units is to be of the "high slip" design type.

31.2.5.8 For ease of drive synchronization, variable frequency controllers are acceptable.

31.2.5.9 The device drive and idler shaft sprockets must be restrained through the use of double setscrews to prevent any lateral movement of the sprockets on the respective shafts. Setscrews alone are not sufficient.

31.2.5.10 The drive(s) shall be sized to permit start-up under full load conditions without noticeable time delay and any abnormal noise from the units.

31.2.5.11 The BHS control circuitry must be designed to ensure that the carousel is running at full speed prior to the start-up of any feed conveyors.

31.2.5.12 The design of the drive circuitry shall be such that the drive motor safety disconnect switch will also "open" the control circuitry of the device whenever the disconnect switch is turned off. Whenever the disconnect switch is turned back "on", it shall be required to reactivate the appropriate device start controls, thus allowing the drive motor start-up to be controlled by the soft start controller. In no case shall it be possible to start the device drive without engaging the soft start. This requirement shall also apply, if variable frequency drives are used in lieu of soft starts.

### 31.2.6 Slat Carrier Assemblies

- 31.2.6.1 Carousel slats are to be synthetic rubber or PVC and should be a minimum of 5mm thick.
- 31.2.6.2 Slats should be supported on rigid formed steel or cast aluminium carriers spanning the conveyor width. Carriers are supported by polyethene tyred wheels at either end, which run in tracks within each carousel sideframe. Wheels to be fitted with internal sealed for life bearings.
- 31.2.6.3 There should be no gaps between slats as they open up on the carousel curves.

### 31.2.7 Frame and Track

- 31.2.7.1 A support system and guide for the chain and slat carriers constructed of standard modular assemblies bolted together shall be provided.
- 31.2.7.2 Levelling screws located at the base of each frame module shall allow for easy adjustment of the assembly.
- 31.2.7.3 Once the structure of the device has been installed and properly aligned, all track joints and guide rail joints shall be welded and ground smooth to assure that the related track and guide surfaces are smooth and without vertical and horizontal differences.
- 31.2.7.4 The design of the device shall incorporate a means of expansion of the device to offset any wear in the main link bushings/connecting link pins or similar components.

### 31.2.8 Finish and Trim

- 31.2.8.1 All conveyor finishes and designs in the public areas must be coordinated with the Buyer.
- 31.2.8.2 All steel trim elements of the carousel that are located in the public area of a terminal shall be manufactured entirely from stainless-steel. Stainless-steel shall incorporate smooth flush edge seams. Radius type edges are not acceptable.
- 31.2.8.3 All stainless-steel trim elements must be properly aligned both vertically and horizontally.
- 31.2.8.4 Butt joints of adjacent stainless-steel trim elements must provide a smooth surface.
- 31.2.8.5 Sharp edges on any of the stainless-steel trim elements as well as voids between adjacent element joints are not acceptable.
- 31.2.8.6 All radii of trim elements must match.
- 31.2.8.7 All fasteners in public areas shall be made of stainless-steel.
- 31.2.8.8 The fastening of stainless-steel trim elements and controls devices shall be performed with fastening methods that are not visible to the public.
- 31.2.8.9 The toe space kick plate shall be set back from the front face of the carousel and shall extend from the underside of the outer shroud to the finished floor and shall be installed only on the outer periphery of the device.

### 31.2.9 Side Walls

- 31.2.9.1 Minimum 125 mm high stainless-steel inner perimeter side walls shall be provided for the entire portion of the carousel in the public area.
- 31.2.9.2 The sidewall should be raised locally to a minimum of 300mm high opposite any conveyor infeed's positions. The transition from a 125mm (or other differing height) to the 300mm height should be smooth and angled at 30 degrees ( $\pm 5\%$  tolerance) to avoid a step change in height.
- 31.2.9.3 Side walls shall be flared at the downstream side of any fire/security door and conveyor infeed position. Additionally, a horizontal filler plate must be installed between the perimeter guard and the flared side wall to eliminate the bag snag point.
- 31.2.9.4 The inside of the carousel and sidewall should be stainless clad to floor level, such that the polished side is the only side visible to the passenger.
- 31.2.9.5 All side walls used as inner perimeter side guards shall be constructed from min 2.0 mm thick steel, with vertical stiffening bracing on a maximum centre spacing of 1,500mm.

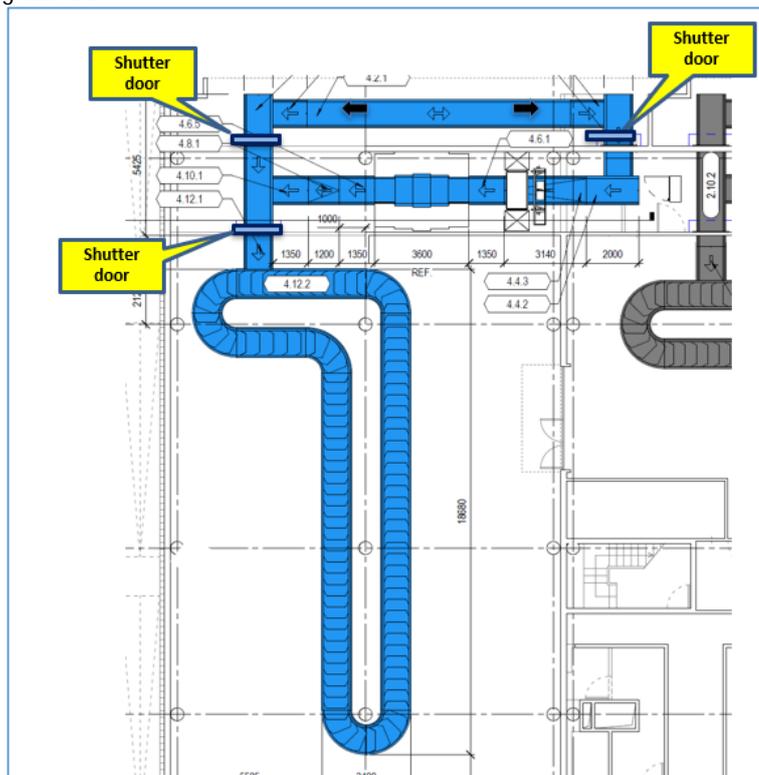
### 31.2.10 Decking

- 31.2.10.1 No internal decking is envisaged for Kaunas Arrivals carousel, and it should be left open to match closely with the arrangement on the existing Reclaim carousel.

## 31.3 ROLLER SHUTTER FIRE AND SECURITY DOORS

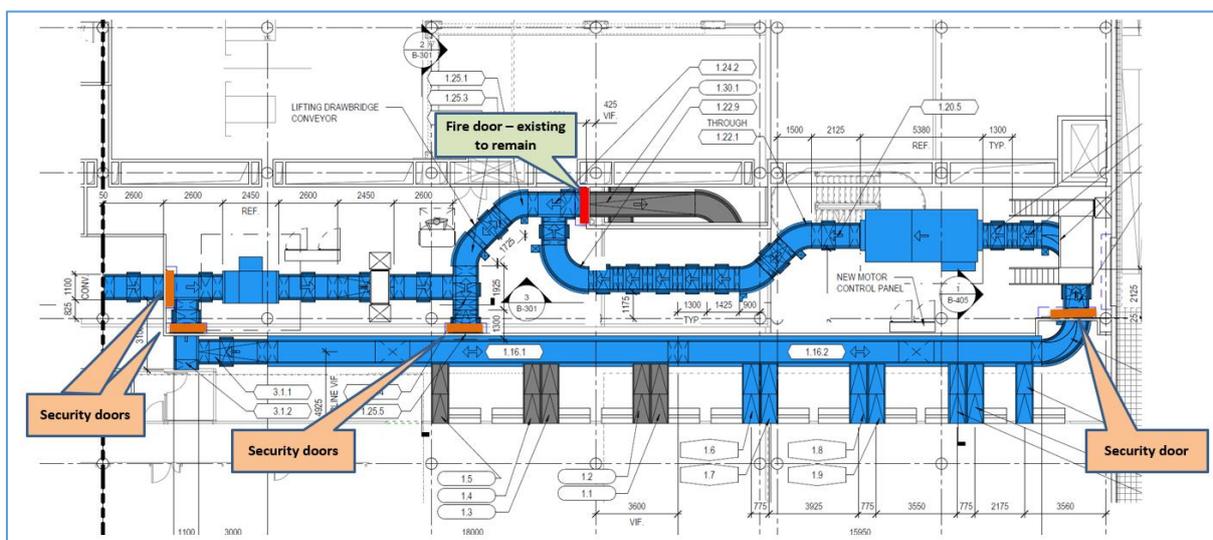
### 31.3.1 Doors for Arrivals

31.3.1.1 A minimum of 3 off Roller shutter Security doors are to be provided for the Arrivals BHS as shown in the following sketch:



### 31.3.2 Doors for Departures

31.3.2.1 A minimum of 4 off Roller shutter Security doors are to be provided for the Departures BHS as shown in the following sketch:



31.3.2.2 The existing roller shutter fire door at the top of the cleared decline conveyor is to remain in situ and operational.

### 31.3.3 Powered Fire Doors

- 31.3.3.1 The Supplier is to supply and install, face mounted roller shutter fire doors as indicated.
- 31.3.3.2 Unless otherwise stated, all fire doors within the scope of the Contract shall, as a minimum, be 3-hour rated. Ensure that fire doors are provided between approved fire zones and at all penetrations between public space and secured areas.
- 31.3.3.3 Doors to be powered via 3 phase motor.
- 31.3.3.4 The door comprises all necessary mechanical door components including tracks, mounting bracketry, hood to cover the wound door, and facias. Where facias are in public view, they shall be stainless-steel.
- 31.3.3.5 The door should be interlocked with the BHS Control System such that the door will open and close automatically upon start-up and shut down of the baggage system. Baggage flow through the door should be monitored such that in the event of the fire alarm being activated the control system will clear baggage from under the fire door before closing the door
- 31.3.3.6 The BHS control system is to be interlocked to the Airport's Fire alarm system, such that on activation of the alarm, the door will be automatically shut in a controlled manner.
- 31.3.3.7 Door motor starter and overload including contacts to BHS PLC I/O so that status of door motor is provided at the SCADA system.
- 31.3.3.8 The door is to include an electrical or pneumatic bottom edge strip for automatic return to open position upon contact with a bag.
- 31.3.3.9 A fusible link which, when broken, will cause the door to close automatically.
- 31.3.3.10 A means for manual operation (e.g. disengagement of the door drive and operation with a chain).

### 31.3.4 Powered Security Doors

- 31.3.4.1 The section above on Fire Doors shall apply to security doors with the exception that there will be no connection necessary to the fire signal box and the doors are not required to be fire rated.

### 31.3.5 Draft Curtains

- 31.3.5.1 Provide draft curtains at all wall and floor penetrations. The draft curtain shall be made up of overlapping strips of flame retardant/non-toxic/anti-static plastic or rubber material.
- 31.3.5.2 The draft curtain shall be designed such that bag travel on the conveyor through the draft curtain is not affected especially on tracked conveyors.
- 31.3.5.3 Draft curtains to have two staggered layers of 200mm wide strips with 50% overlap. The draft curtains shall be minimum 3mm thick
- 31.3.5.4 The colour of the draft curtain shall be black.
- 31.3.5.5 Provide a 3mm thick stainless-steel fascia, towards the public areas.



- 31.4.3.1 The Supplier shall design, manufacture and install all required platforms, walkway, access ladders and crossovers required for efficient operation of BHS. The design shall ensure that all such provisions are fit for purpose and complies with all Code Requirements.
- 31.4.3.2 The Supplier shall be responsible for the design supply and installation of all conveyor supports, leg sets, etc. as needed for the BHS support from the primary internal structural frame. The Supplier's secondary structure shall be designed to support the weight of the conveyor and baggage-imposed load, and lateral and vertical loads imposed by seismic events.
- 31.4.3.3 The final setting out of the internal structural frame shall be assessed and confirmed by the Supplier based on survey of the existing baggage conveyor arrangement. Any redesign or modification of the internal structural frame is to be carried out by the Supplier.
- 31.4.3.4 The Supplier should consider developing the access and walkway detail with input from Buyer to ensure an acceptable solution is provided. It is essential that the Supplier's design does not impede on operational and maintenance access to services and equipment.
- 31.4.3.5 The Supplier shall include for guarding underneath conveyors and/or platform structure in and around all parts of the system sufficient to ensure that items may not fall from walkway/conveyors/mezzanine onto the floor below.
- 31.4.3.6 Regardless of which solution the Supplier proposes, it shall take full cognisance of the need to comply with statutory egress requirements in the event of fire and emergency situations.
- 31.4.3.7 The Supplier shall include the provision of high-visibility head bump protection to all low head clearance areas in and around the BHS and achieve written approval/acceptance from the BHS team on the coverage plan. The Supplier shall ensure that an appropriate hard-wearing adhesive is used to affix head bump protections to ensure this remains attached in the long term.
  
- 31.4.4 **Conveyor Floor Supports**
- 31.4.4.1 Where required, provide floor supports for conveyors and equipment integral to the baggage system including X-ray Machines. The supports must ensure the stability, strength, safety and ergonomics of the equipment.
- 31.4.4.2 Generally, equipment located within 2,500mm of the floor or any mezzanine shall be floor supported.
- 31.4.4.3 Note that the BHS load (new and existing equipment combined) shall not exceed 300 kg / sqm.
- 31.4.4.4 All support structure must be designed and installed so that maintenance access to the conveyor components and access to walkway(s), work areas and drive aisles are not blocked.
- 31.4.4.5 The location of the floor support shall not impede the installation/removal of the conveyor gap pan.
- 31.4.4.6 All floor supports shall be provided with vibration isolators to ensure that there is no noticeable vibration transmitted to the building by the BHS.
- 31.4.4.7 Supports for EDS Machines integrated into the BHS shall be provided and shall be designed, fabricated and installed with allowance for future removal and replacement of the equipment without affecting operation of adjacent conveyor lines.

#### 31.4.5 Overhead Supports

- 31.4.5.1 The Supplier is responsible for the design and structural integrity of all bolts, hangers, support structures etc., and shall provide all necessary materials required for installation. The supports must ensure the stability, strength, safety and ergonomics of the equipment
- 31.4.5.2 Note that the maximum BHS load (new and existing equipment combined) shall not exceed 300 kg/sqm. Where the structure cannot support load from overhead and the load has to be supported from floor (or a combination of both) or access required for equipment / services below the BHS equipment prohibits overhead support, the Supplier shall distribute the load appropriately and / or provide floor supports as detailed in the specification.
- 31.4.5.3 Equipment located 2,500mm or more above the floor or any mezzanine shall be supported from above.
- 31.4.5.4 As a minimum, threaded rods shall be designed to ensure that they cannot become loose throughout the life of the BHS.
- 31.4.5.5 All conveyors shall be adequately sway braced in order to ensure that there is no lateral or longitudinal displacement, providing a rigid and rugged installation.
- 31.4.5.6 Installation and layout of header steel and all support structure shall not pose interference to maintenance and operation access.
- 31.4.5.7 Where BHS support structure is attached to existing building supports, the Supplier is responsible for removing any material including fire protection equipment from such beams prior to attachment. The Supplier shall repair and replace any material removed from building beams including fire protection material to a condition satisfactory to Owner.
- 31.4.5.8 Equip all overhead supports with vibration isolators to ensure that there is no noticeable vibration transmitted to the building.

#### 31.4.6 Platforms and Walkways

- 31.4.6.1 Provide as a minimum, the maintenance platforms as shown in the Contract drawings or as required to ensure safe access for all personnel who operate, maintain or have access to the BHS.
- 31.4.6.2 All sensors, drive power units and control panels shall be located on the platform/walkway side of the conveyor.
- 31.4.6.3 Include personnel protection at all platforms and walkways to ensure that any potential injury is minimized. This includes swing gates or off-sets at access locations, padding, rounded corners, smooth welds, deburred surfaces and any other measures as may be necessary.
- 31.4.6.4 Attach all platforms and walkways to the support structure, whether using decking of 'checker plate' or steel open bar grating.
- 31.4.6.5 All steel bar grating shall be installed with the bearing bars installed in the direction of personnel travel to avoid trip hazards. Grating installed with bearing bars across the width of a platform will be considered unsafe and will require re-installation according to this specification.
- 31.4.6.6 Design platforms and walkways to provide adequate space for operating and maintenance personnel.
- 31.4.6.7 Design structure to limit the deflection to 1/360 of the unsupported span length, under a concentrated 150 kg load.
- 31.4.6.8 Design all platforms and walkways capable of supporting a dynamic live load of 300 kg/m<sup>2</sup>.
- 31.4.6.9 Securely weld all pieces of decking to the platform frame and all structural cross members.
- 31.4.6.10 Any walkways with inclines of up to 8 degrees shall be equipped with an anti-skid walking surface. Walkways with inclines of more than 8 degrees shall be equipped with steps as well as the anti-skid material.
- 31.4.6.11 Provide steps and handrails at all locations where there is an elevation change in excess of 200mm. Paint the step "safety yellow".
- 31.4.6.12 Minimum walkway width shall be nominally, 750mm with a 75mm maximum gap between the conveyor and the walkway.
- 31.4.6.13 Unless otherwise noted on the drawings, the top of platform shall be installed 200mm below the top of belt at the intermediate section of the conveyor (between drive sections) and 375mm below the top of belt at the drive sections.
- 31.4.6.14 Provide any additional features required by local code.
- 31.4.6.15 Where conveyors are double stacked and located on a walkway, provide walkway at the lower level of conveyor only provided the upper level is accessible from the walkway.
- 31.4.6.16 Maintain a minimum of 2,100mm clear above walkway and platform wherever possible.

#### 31.4.7 Handrails