AVIATION SECURITY

SECURITY CHECKPOINT LAYOUT DESIGN / RECONFIGURATION GUIDE

Transportation Security Administration

PREPARED FOR THE TRANSPORTATION SECURITY ADMINISTRATION

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TABLE OF CONTENTS

SECTION NO. PAGE NO.

LIST OF FIGURES

FIGURE NO. PAGE NO.

1.0 INTRODUCTION

Over the past several years, a number of critically important checkpoint design elements have been identified and integrated to create a typical Transportation Security Administration (TSA) Security Screening Checkpoint (SSCP). This document expounds upon the checkpoint design planning as identified in the airport security planning guide. The intent of this document is to provide lessons learned from that experience, and present ideas, technology and guidelines that shape the SSCP design. The information provided will prove useful to Federal Security Directors and staff, as well as, airport planners, architects, and engineers to assist in the design or redesign of a SSCP.

Each airport and airport terminal building is unique in terms of physical design and operational requirements. Therefore, no single SSCP solution will work for all airports, or possibly even among multiple locations within the same airport. This section discusses where and how large an SSCP should be base on a variety of conditions.

The location and size of the SSCP depends, among other things, on the type of risk that is present or anticipated, the type of operations at the airport, the passenger loads, and the character of the overall design of the airport. Proper SSCP design helps avoid a host of problems for the airport and airlines, including terminal and queuing congestion, delays, and unnecessary security risks.

This document addresses the following topics:

- General Checkpoint Issues
- Essential Coordination
- Planning Considerations
- Elements of the SSCP
- SSCP Operational Efficiency
- SSCP Layout Standards
- SSCP Spacing Requirements
- SSCP Project Funding
- Designing for the Future.

1.1 GENERAL CHECKPOINT ISSUES

SSCPs are a critical element of an airport's terminal security design, and must be included in the planning, design, and engineering phases of the project from its conception. It is dually important to engage airport and airline representatives early on in the project discussions. Performance requirement of a SSCP along with airport/airline responsibilities are described in a number of TSA regulatory documents, many of which are not available to the general public.

Security screening is intended to prevent hijackings and deter the transport of any explosive, incendiary, or deadly and dangerous weapon aboard a commercial aircraft. SSCPs provide screening of passengers and their carry-on or personal items in addition to credentialed airport, airline and concession employees, and concession delivery personnel. Non-ticketed visitors are currently not allowed beyond security screening checkpoint. Design consideration must also be given to persons with disabilities using wheelchairs and other assistive devices.

Among the general issues to consider are:

- Cost-effectiveness for airlines, airports, and TSA;
- Deterrence of potential adversaries, both in terms of actual detection of contraband of any kind, and in creating the maximum perception of effective security measures;
- Effective and secure handling of goods and services other than individuals, required to cross from non-sterile area to sterile area;
- Safety and ergonomic design;
- Efficient and effective use of terminal space, providing more space for operational or revenue generating uses;
- Flexibility to accommodate highly-specialized equipment with constantly changing engineering requirements;
- Minimal interruption or delay to flow of air-travelers and others passing through the terminal from non-sterile public areas to sterile areas;
- Operational flexibility in response to changes in passenger load, equipment use, and operational processes, including the increasing use of electronic identification media;
- Prevention of SSCP exit lane breaches for entry into sterile areas;
- Coordination of Heating, Ventilating and Air Conditioning (HVAC), electrical, lighting, telecommunications and electronic components of the SSCP;
- Protection of SSCP integrity when not in use;
- Space, including the availability of office space for Information Technology (IT) equipment and TSA staff work areas.

1.2 ESSENTIAL COORDINATION

Key individuals with TSA, co-located government agencies, airport and airline operations personnel should be partnered with throughout the stages of the SSCP design process. Many airports are subject to local, city and state building codes, mutual aid agreements with local law enforcement and emergency responders, and may be party to other arrangements, such as or a joint military presence on the airport, that could strongly affect many or all areas of security design.

TSA requires all checkpoints to be formed as collections of single and double-lane team modules as illustrated in “SSCP layouts.” Modular design enables a controlled and contained screening environment where “sterile” and “non sterile” passengers and baggage are separated from each other. Whenever possible, allowances should be made for flexibility and expandability of the checkpoint space to respond to changes in technology, equipment or processing procedures.

The location of the SSCP relative to concessionaires and other airport services should be resolved early in the process through conversations with appropriate airport representative, as this will affect airport operations and critical revenue streams.

1.3 PLANNING CONSIDERATIONS

Airports with international flights support complex operations and may be seen as a higher level of threat than pure domestic airports. As a consequence, SSCPs at these airports may require more pieces of screening equipment and greater staffing levels in the SSCP and elsewhere throughout the airport. As a result, these airports will require more terminal space to accommodate the SSCP.

Airports equipment and staffing requirements may differ due to passenger loads and throughput based on checkpoint configuration. The designer should not be misled into believing that lesser levels of security are therefore appropriate, as all airports represent points of entry into the aviation system, and must meet minimum security criteria. Forecasted airport growth must be taken into consideration when assessing space requirements and allow for expansion and new technology.

Vulnerabilities specific to a particular airport may affect the decision for the location of a particular SSCP. Some airports might choose to install a permanent security screening zone at or near the entrance of the terminal, making all interior spaces beyond that point sterile. The more common choice is to allow unscreened access further into the terminal, but may require that space and utility connections be available for temporary installation of SSCPs at the entry of the terminal during periods of elevated threats. If the SSCP is implemented close to an entrance wall, thoughtful consideration must be given to passenger queuing to avoid creating a target by massing people in public areas.

1.3.1 OPERATIONAL TYPES

Airports can be characterized as Origin and Destination (O&D), Transfer/Hub, or a combination of the two, with regional and commuter traffic included in all three.

In Transfer/Hub operations, transfer passengers frequently move from gate to gate without passing through the airport's SSCP. If concessionaires are in the sterile area, this pattern is reinforced. If the main concession is in the non-sterile public area, there may be an incentive for passengers to exit the sterile area and subsequently reenter through the SSCP, burdening it with added traffic that might otherwise be unnecessary.

Transfer/hub operations benefit from an SSCP that is located so that passengers can move among gates along multiple concourses without being re-screened. On the other hand, O&D operations may benefit when SSCPs are located near individual hold rooms and only staffed for individual departures. Very small airports often screen directly before boarding a flight, and provide little or no hold room space; these SSCPs may be located directly at the door to the airside.

1.3.2 SSCP SIZE

While vulnerability assessments and operational characteristics (such as level of service) play a large role in determining the location of SSCPs, it is the current and anticipated passenger load that ultimately influences the sizing and design of the SSCP.

For general planning purposes, an SSCP will generally include at a minimum, one walk-through metal detector and one X-ray device. The exception to this rule would be very low activity airports where manual search procedures could be employed.

1.4 SSCP REVIEW, APPROVAL AND PROJECT FUNDING

Modifications to TSA Security Checkpoints must be closely coordinated with TSA's Chief Technology Office (CTO). This will ensure that proper equipment and resources are deployed in a manner that emphasizes heightened security, workforce safety, and customer service. **Figure 1-1** on the following page is an outline of the Construction Review and Approval Process for airports, airlines, other stakeholders and TSA representatives who will be submitting for changes to current security checkpoints. Requests are submitted via an online form called the Checkpoint Equipment Request Form, shown in **Figure 1-2**. The Checkpoint Equipment Request Forms can be requested from and submitted to the following DHS email address, ScreeningSupportRequest@DHS.gov. Sample Checkpoint Equipment Request Forms are shown in **Appendix B**.

The Airport, TSA and the planner/designer of a SSCP should coordinate and determine funding responsibilities for costs involved with design and construction.

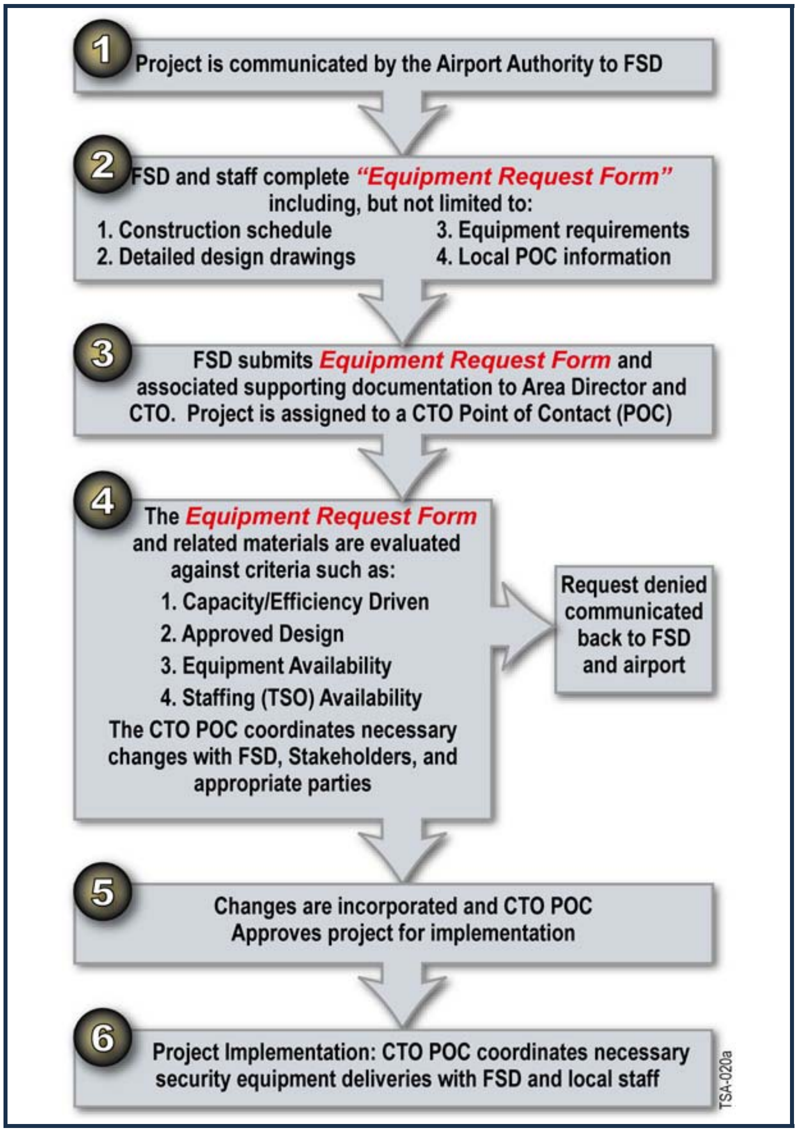


Figure 1-1. Construction Review and Approval Process

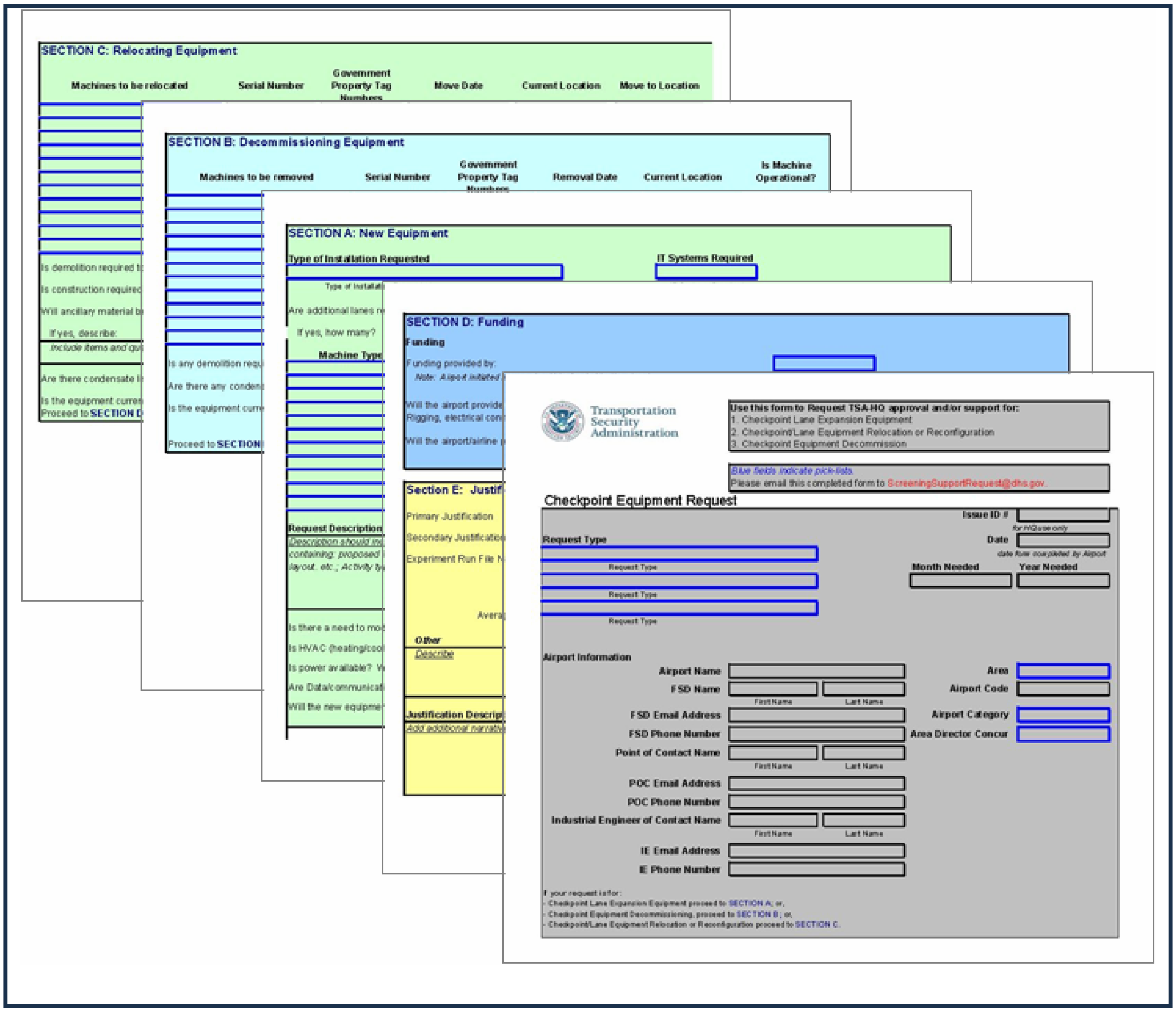


Figure 1-2. Checkpoint Equipment Request Form

1.5 DESIGN CONSIDERATIONS

1.5.1 DESIGNING FOR THE PROCESS

Good design should conform to the activity that it supports. Procedures are in place and being further refined which outline the process that every passenger and bag must undergo in order to properly fulfill the goals of the SSCP. It is critical that the SSCP layout support this process. SSCP layout should respond to the fact that divesting and placing items on the belt are each discrete activities that take a certain amount of time. They are also activities that should begin well before the passenger reaches the WTMD or ETP.

The designer may consider conveyor belts with a somewhat longer “presentation length” on the non-sterile (public) side, to allow more time and space for passengers in line to begin placing items on the belt.

1.5.2 DESIGNING FOR THE FUTURE

Airport security technology is a dynamic and rapidly changing field. No matter how carefully an airport is designed to take maximum advantage of the current technology, designs must be sufficiently flexible to meet changing needs and hardware. Security screening equipment dimensions and/or processes may change, requiring the entire airport security managerial infrastructure to make important decisions for modifications, which the designer must then accommodate. The designer’s task will be easier if the original design has anticipated the need for change, with size and space considerations at all phases of the SSCP.

2.0 ELEMENTS OF THE SSCP

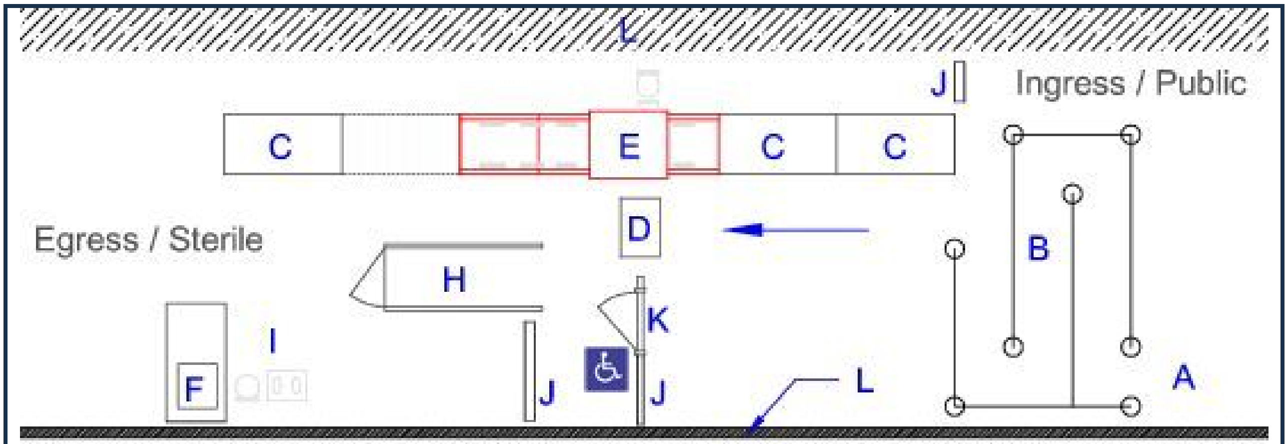
The purpose of this section is to provide a checklist of the typical elements that comprise a checkpoint, along with their sizes, space requirements, and other considerations that should be taken into account in the overall SSCP design.

SSCPs are usually made up of elements that are similar from one installation to the next, whether they are pieces of equipment, floor space required for the operator to function or areas for pedestrian flow. The size of some elements is nearly universal, such as metal detectors. Others can be highly variable, such as queuing space, which varies with load factors and throughput. Full SSCP layout diagrams are provided in Section 4, "SSCP Layout" to illustrate options of how each of these elements can be located. Please note that Designers and Planners may suggest preferred equipment choices, however the TSA will make final determination for each installation and checkpoint reconfigurations. **Figure 2-1** indicates the standard elements of a TSA checkpoint. This list is based on technology available at the time of publication of this document. Equipment and configurations may change as new technology becomes available.

Checkpoint Area	Equipment Elements
Per Single Lane	▪ (1) Enhanced Walk Through Metal Detector (WTMD) ▪ (1) Carry-On Baggage X-ray with roller extensions ▪ (1) Ergonomic X-ray operator chair ▪ One or more CCTV cameras
Per Module (1 or 2 Lane)	▪ (1) Explosives Trace Detection (ETD) machine ▪ (1 or 2) Bag Search Tables ▪ (1) Glass Wanding & Holding Stations ▪ Anti-fatigue mats
Per Checkpoint	▪ (1) Law Enforcement Officer (LEO) Station or position ▪ (1) Supervisor Station (at larger airports only) ▪ (1) Private Search Area ▪ (1) Data Connections/Cabinet

Figure 2-1. Elements of a Standard TSA Checkpoint

Conceptual drawing shown in **Figure 2-2** underscores the point that all elements of the system, no matter how seemingly insignificant require an allocation of dedicated space. **Figure 2-2** shows typical elements that may be part of the screening process in the direction (top-to-bottom) that a passenger moves from non-sterile to sterile areas.



Legend (letters refer to those within the diagram):

A = Pre-screening Preparation Instruction Zone
B = Queuing Space
C = Divest & Composure Tables
D = Walk-Through Metal Detector (WTMD)
E = Carry-on Baggage X-ray (TRX) Machine
E = Explosives Detection Systems (EDS) – *(not illustrated)*
F = Explosives Trace Detection (ETD) Machine with table
G = Explosive Trace Portal (ETP) – *(not illustrated)*
H = Passenger Containment
I = Passenger Inspection
J = Metallic/Non-metallic Barrier
K = Non-metallic ADA Gate
L = SSCP Adjacent Walls/Barriers

Other Elements (not illustrated in this diagram):

X-ray operator chair
Anti-fatigue mats
Egress Seating Area
Video Systems in Pre-Screening Zone
LEO Station
Supervisor Station
Private Search Area
SSCP CCTV Coverage
Data Connections / Cabinet
SSCP Lighting
Wireless Access Point
Exit Travel Lane
Exit Lane Station
Exit Lane CCTV
Integrated Exit Lane Systems

Note: Refer to above for the Security Screening Checkpoint Elements.

Figure 2-2. Typical SSCP Layout and Elements

2.1 PRIMARY CHECKPOINT ELEMENTS

2.1.1 A – PRESCREENING PREPARATION INSTRUCTION ZONE

This zone is an area in front of the SSCP that uses architectural features, simple signage, instructional videos, and “ambassador” staff to create a calming atmosphere and more efficient throughput by instructing and directing passengers for efficient screening flow. Simple and effective signage can be used to direct and instruct users of the SSCP, increasing the speed and perception of service. Whenever space allows, use large poster format to display TSA and airline specific signs in a single highly visible location in the checkpoint queue. The poster signs will minimize the large number of stanchion topper signs at the front of the checkpoint and improve visual control. **Figure 2-3** shows a number of the large poster signs including TSA prohibited items, film advisory, notice of private screening, TSA warning signs, airline carry on requirements and pet restrictions. Simple divesting signage can be placed in several locations at the prescreening zone as illustrated in **Figure 2-4**. Video monitors may be used to illustrate prohibited items, divesting, loading bags on the conveyor, and walking through the metal detector and ETP. Signage should be kept very simple and should be integrated and approved relative to the airport’s signage policy.

Figure 2-3. SSCP Large Poster Signs

Simple divestiture panels with pictures and photographs can be installed by the divesting tables at the front of the SSCP to provide clear divesting instructions to passengers as shown in **Figure 2-4**. Floor stickers to indicate lane numbers and directional arrows illustrated in **Figure 2-4** can be used to enhance passenger flow throughout the SSCP. When appropriate, tent signs and wall flag can be incorporated in the SSCP to provide additional instructions to passengers.

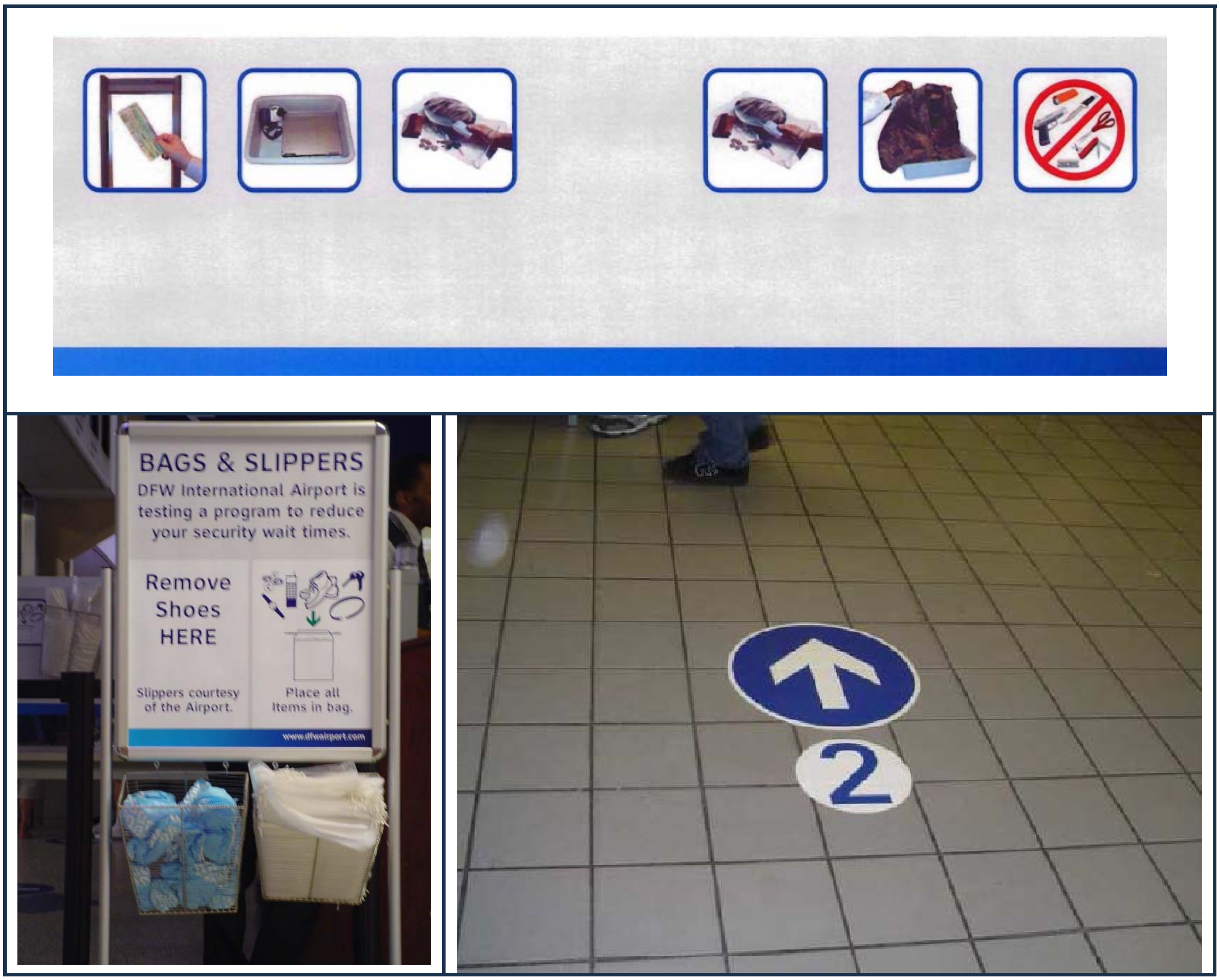


Figure 2-4. SSCP Simple Signage, Dispensers and Floor Stickers

2.1.2 B – QUEUING SPACE

An appropriate space allocation should be made on the non-sterile (public) side of the checkpoint for passenger queuing. This space should include room for tables near the screening equipment, for preparing their belongings for screening. Emphasis on efficient queue management, passenger education and divestiture in this area will greatly improve the efficiency of operations for all. Note that staff-support amenities such as a coatroom or lunchroom are in addition to the size requirements developed from passenger loads, and are generally located away from the SSCP. **Figure 2-5** displays the type of queuing stanchions used for passenger queuing to the checkpoint. Also, lack of an allocated queue space will cause the passenger queue to expand into adjacent areas and will impede the general flow of passengers through the airport.

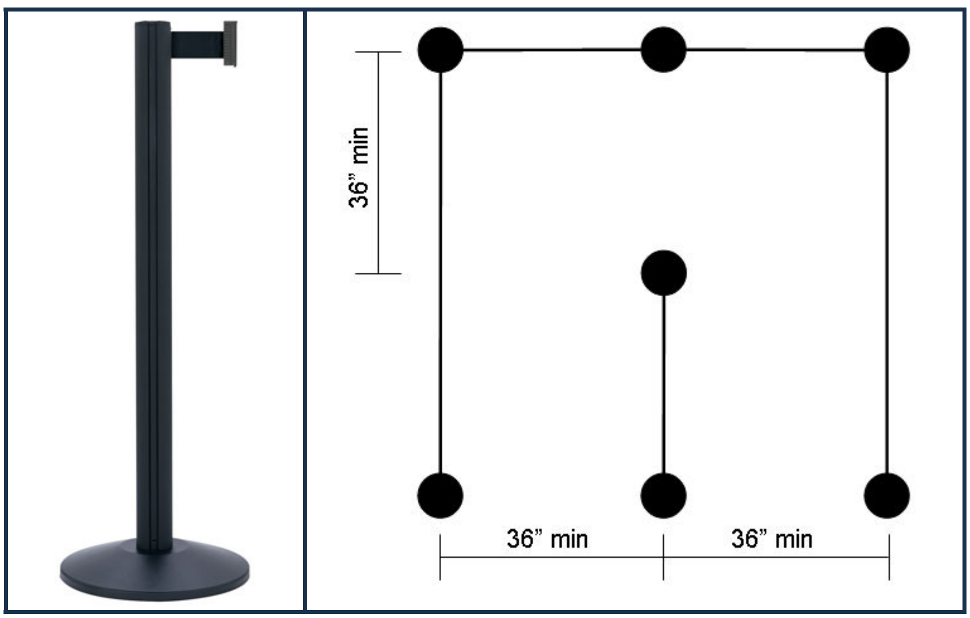


Figure 2-5. Queuing Stanchions

SSCP layout can affect the queue dramatically. When evaluating queuing space, TSA suggests estimating 9 SF per passenger. In designing the layout of the queue, be aware of specific path of travel conflicts: the queue should not interfere with other traffic patterns. In some airports an attended station before the queue may be used to check for tickets if only ticketed passengers are allowed into the queue.

As a general rule, the passenger queuing area should be sized to contain a 10 minutes wait of passengers when all lanes of a checkpoint being fed by a particular queuing area are open.

2.1.3 C - DIVEST AND COMPOSURE TABLES

Divest and composure tables (see **Figure 2-6**) are areas provided onto which a passenger divests and retrieves personal items before and after the X-ray exam process, respectively. Current checkpoints have a variety of tables deployed; however, for new and redesigned checkpoints, TSA Headquarters has made standard tables available through Chief Technology Office (CTO). These tables are stainless steel, with height-adjustable legs and come in 4’ and 6’ lengths and 30” widths. The tables should be considered for their added value of throughput efficiencies at all lanes. Lanes that do not have a least one divest and composure table respectively, have the potential for added delay while the passenger divests or composes. TSA strongly recommends at least two divest tables aligned directly with the in-feed belt of the X-ray and one composure table that is aligned flush with the egress extension rollers.

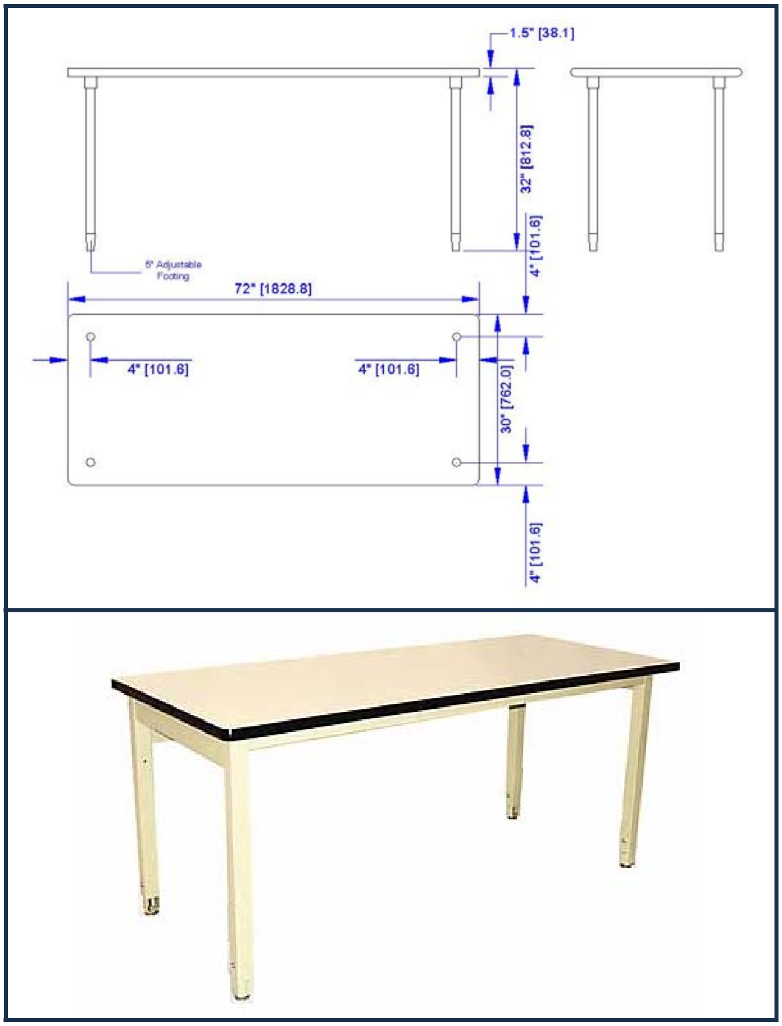


Figure 2-6. Typical Divest/Composure Table

2.1.4 D – WALK-THROUGH METAL DETECTOR (WTMD)

Over the past few years, TSA has upgraded all earlier WTMDs to an “enhanced” status. During this transition, TSA referred to the earlier devices as WTMDs and the newer devices as Enhanced Metal Detectors, or EMDs. Now that all deployed devices have been upgraded to “enhanced” status, all deployed metal detectors are referred to as WTMDs.

The WTMD is a walk-through arch used for the detection of metal weapons and/or metal contraband concealed or carried on a person. With the deployment of the latest metal detector technology, there are a number of placement requirements that must be considered to minimize environmental and equipment interference:

- The WTMD should be aligned next to the center of the X-ray chamber, equidistant from both the ingress and egress points of the chamber.
- The sides of the WTMD should be given a 12” to 15” clearance from all other equipment, walls, or columns located in the checkpoint. Certain factors can interfere with WTMD operation and should be considered when determining the design surrounding the desired WTMD location. An exemption to the 12” spacing requirement is when the equipment placed near the WTMD is a non-metallic barrier. The clearance for non-metallic barriers to a WTMD should be 2-3” and not flush to the side of the WTMD.
- Electrical fields from escalators, conveyor belts, neon fixtures, transformers, banks of electrical circuit breakers, power cables, conduit, speakers, etc., both overhead and below the floor.
- Metal from surrounding architecture, including floors, floor supports, doors, metallic framing, wall support studs, facade systems, etc.
- Surface vibrations created by equipment above, below or immediately adjacent to the checkpoint, including baggage conveyors, subway trains and heavy truck traffic.
- The electrical plugs for WTMDs should be secured using twist-lock receptacles. The WTMD electrical power cord should be secured and not run across walking/working surfaces to ensure that it does not pose a trip hazard. Emergency or backup power is not required for WTMDs in checkpoint areas at this time.

Upon installation, WTMD machines will be bolted or otherwise secured to the floor. Currently, only the original equipment manufacturer (OEM) is certified to recalibrate these machines; consequently, WTMDs cannot be moved by anyone except the manufacturer. Typically, TSA will deploy different manufactures’ equipment based on compatibility with existing checkpoint equipment.

Refer to **Figure 2-7** and **Figure 2-8** for information on WTMD dimensions and currently approved models.

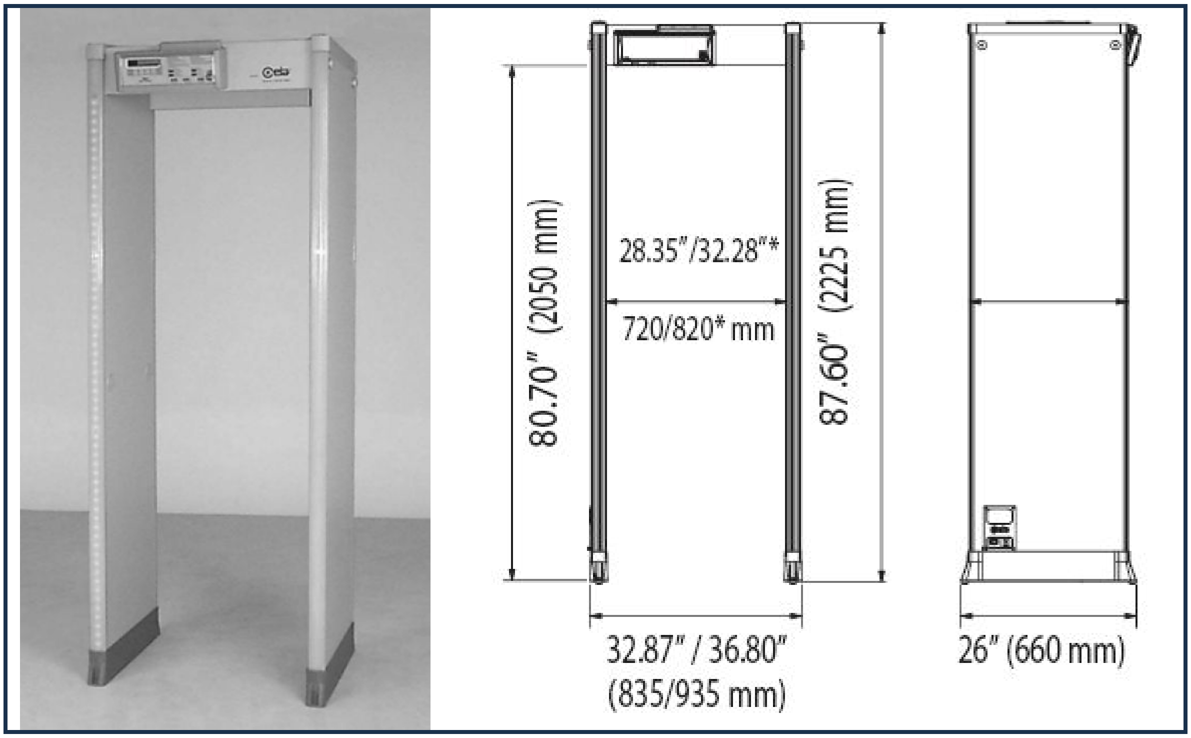


Figure 2-7. Typical WTMD Dimensions

Manufacturer	Model	Width	Depth	Height	Width Entry	Height Entry	Power (110vac)
CEIA	02PN20	32.75	26	87.5	28.25	80.75	30 watts
Garrett	6500i	35	23	87	30	80	55 watts
Metorex	200HDe	36.2	23.4	85.7	30	79.2	45 watts

Figure 2-8. Current TSA Approved WTMDs

2.1.5 E – CARRY-ON BAGGAGE X-RAY (TRX) MACHINES

The space requirement for a checkpoint X-ray includes the floor area for a number of components and functions performed at the X-ray machine. These areas are:

- Baggage loading onto the in-feed conveyor
- X-ray equipment
- X-ray TSO (Transportation Security Officer)
- Baggage pick up from the exit conveyor
- Secondary inspection

The X-ray machine itself is one of the largest and heaviest components of the SSCP. The floor structure must be able to support the X-ray machine or reinforced to support the weight, and electric power must be provided.

Video monitors are typically mounted to assist in controlling the rate at which the images are viewed by the TSO. Interpreting the information contained in the images requires focused concentration. It is desirable to provide the X-ray TSO an ergonomic, distraction-free environment. The space should be designed to minimize monitor screen glare from interior lighting, and sunlight from windows which can also wash out or produce glare on monitors. Ideally, the monitor height should also be adjusted so that it is as close as possible to the optimal viewing angle (not more than 15 degrees down from the X-ray TSO's eye level). It is recognized that this may not always be achievable due to the constraints imposed by the size and height of the X-ray system; however, the goal should be kept in mind during the design process. It is recommended, the X-ray operator has a clear view of the X-ray machine's entry and exit conveyor.

The exit conveyor is generally two individual sections, a slow-running section at the exit of the X-ray, and a faster-running section that carries bags to where they are retrieved by the passenger. A longer second-section is advantageous because it can transport bags further past the WTMDs, reducing the congestion of passengers collecting their baggage which often impedes passenger flow. In general, the location that bags exiting the X-ray machine end up should be planned carefully in relation to overall checkpoint flow issues, especially considering where passengers will exit primary and secondary metal detectors. If additional length is required, egress extension rollers can be added to the X-ray machine. Extension rollers are available in 3'-3", 4'-0", and 6'-0" lengths depending upon manufacturer.

Another important consideration is the return of bins from the passenger composure area to the divest side of the X-ray. Lifting and carrying of bins by TSOs is known to be a significant injury risk and should be eliminated if possible. At this time there is no single TSA standard bin return system to eliminate the need for TSOs to lift and carry bins; two possible systems which can be considered are a roller/slide system and a non-metallic bin cart system.

Recalibration and testing after movement of X-ray machines is dependent on the distance, type, and nature of the move. Consult the manufacturer for specific calibration requirements.

Refer to **Figure 2-9** and **Figure 2-10** for X-ray dimensions and currently approved models.

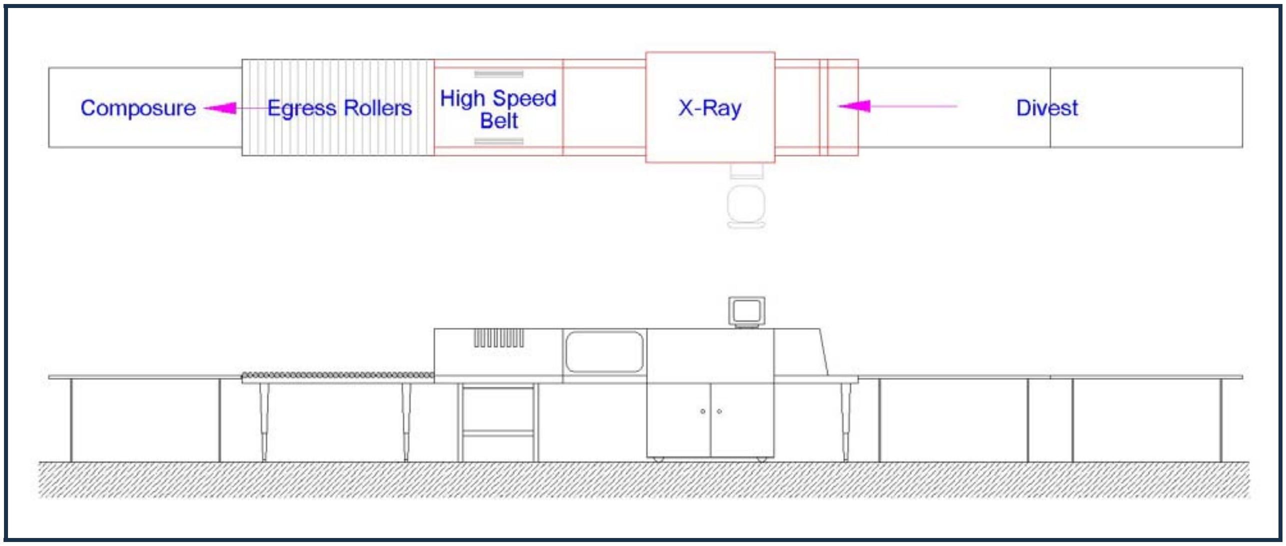


Figure 2-9. Standard Size and Layout of an X-ray Implementation

Manufacturer	Model	Length [1] (w/o Roller)	Width	Height	Weight (lbs)	Tunnel Size	Power (110 VAC)
Smiths Heimann	7555i	83.5	39.2	56.8	1,279	29.5 x 21.7	--
Smiths Heimann	6040i	78.9	33.5	50.6	882	24.2 x 16.1	--
Rapiscan	520B	102.0	33.1	53.0	1,232	25.2 x 16.9	10 amps
Rapiscan	522B	109.5	41.3	58.1	1,367	29.5 x 21.6	10 amps

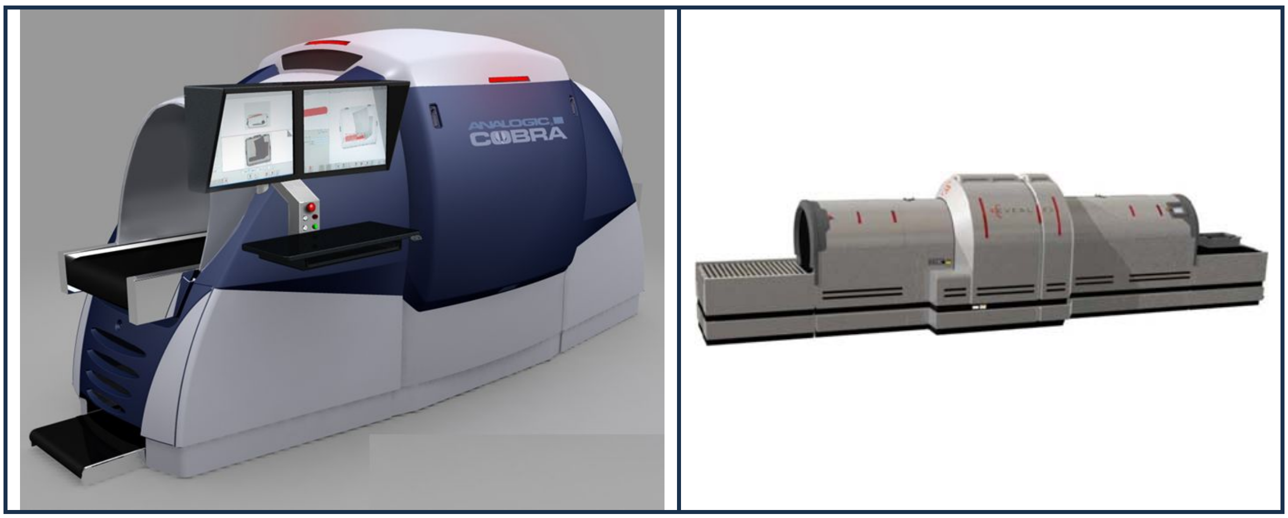
[1] Note: The length indicated is that of the X-ray main belt and does not include the High Speed Belt.

Figure 2-10. TSA Approved Carry-On Baggage X-rays

2.1.6 E – EXPLOSIVE DETECTION SYSTEMS (EDS)

EDS developed under TSA's Cambria program (EDS Project for Carry-on Baggage and Possessions at Passenger Checkpoints) are direct checkpoint X-ray replacement machines for the automated screening of passenger carry-on baggage and divested articles. These systems are intended to enhance the carry-on baggage inspection process currently used in U.S. airports. TSA introduced the Cambria program to develop systems capable of increasing the security of carry-on bags and optimize the flow of passengers through the checkpoint.

Many of the requirements previously noted for the checkpoint X-ray also apply to the checkpoint EDS. This includes space requirements, floor loading, EDS operator ergonomics, and divest and composure space requirements. The EDS are typically longer (193.6" – 214.6") and heavier (3,800 lb – 4,550lb) than checkpoint X-rays (83.5" – 109.5" and 882 lb – 1,367 lb respectively) requiring greater linear floor space and floor loading requirements. Refer to **Figure 2-11** for EDS dimensions and weights of available models which vary depending on manufacturer. **Figure 2-12** on the following page provides a comparison of the two manufacturers' checkpoint EDS.



Manufacturer	Model	Length (w/o Roller)	Width	Height	Weight (lbs)	Tunnel Size	Power (240 VAC)
Analogic	Cobra-A	214.6	58.9	69.8	3,800	18.3 x 25.9	20 amps
Reveal	CT-80FX	193.6	55.1	57.5	4,550	24.2 x 16.1	30 amps

Figure 2-11. Space Required for Typical EDS

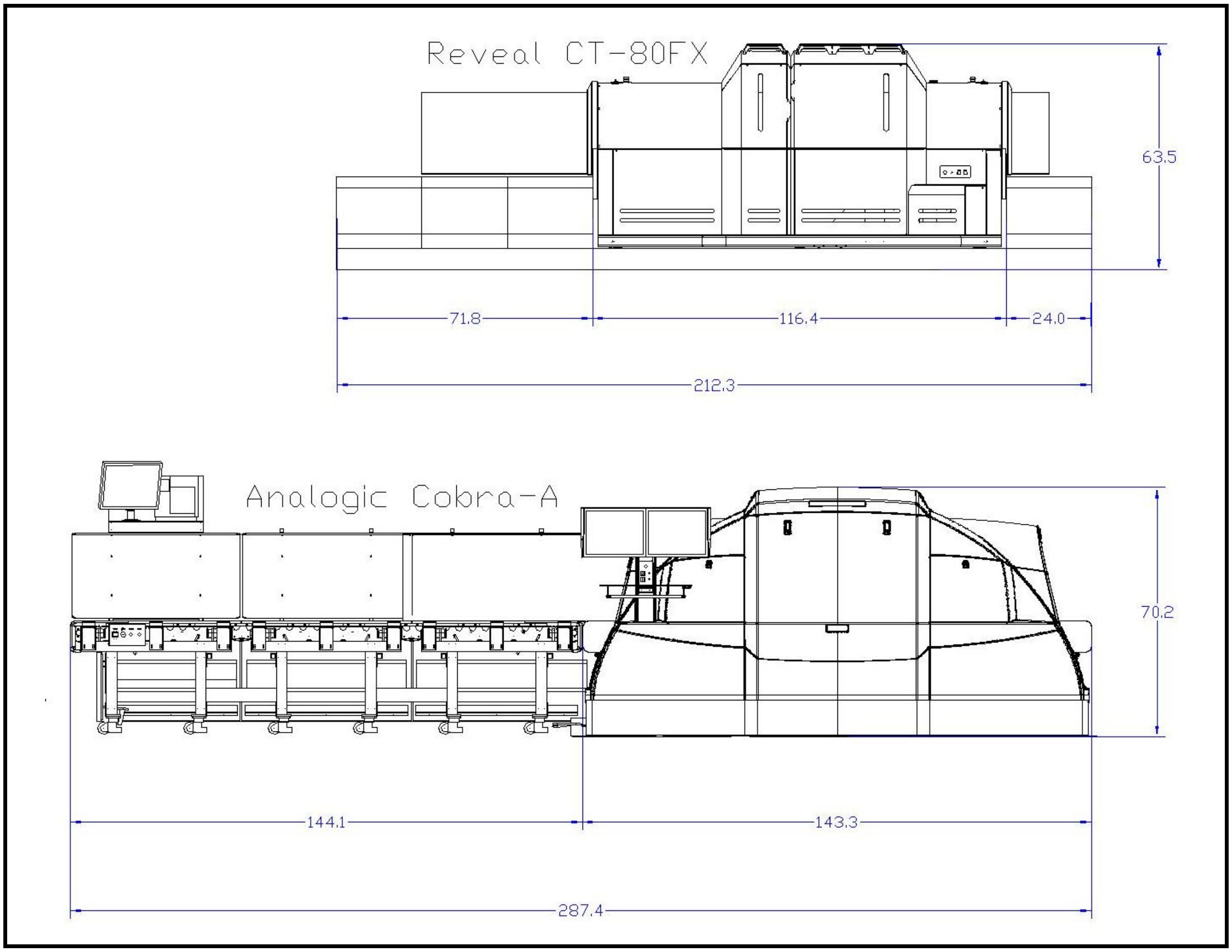


Figure 2-12. Comparison of Checkpoint EDS Scanners *(units in inches)*

2.1.7 F – EXPLOSIVES TRACE DETECTION (ETD) MACHINES

Explosives trace detectors (ETDs) are generally placed upon 6’ (L) x 3’ (W) standard stainless steel-topped tables consisting of two elements: an open bag search area and a protective hood surrounding the ETD. Two-piece tables are also available. The location of ETD’s should support two lanes and be located out of the natural flow of exiting passenger traffic to prevent accidental placement of passenger bags on the ETD table. Environmental variables must be taken into account when determined the type of ETD that will be deployed to the respective location. Variables to be evaluated include temperature, humidity, and air quality, depending on location.

Refer to **Figure 2-13** and **Figure 2-14** for information on ETD dimensions, currently approved models and typical storage cabinet.

Figure 2-13. Typical ETD Machine and Cabinet

Manufacturer	Model	Width	Depth	Height	Power (110 VAC)
Smith (Barringer)	Ionscan 400B	15.5	13.5	13	6 amps
GE Interlogix (Iontrack)	Itemiser 2-Windows	21	18.5	14.5	115/230 VAC
Thermo Electron	Egis II	28.5	29	18.5	--

Figure 2-14. TSA Approved ETD Machines

2.1.8 G – EXPLOSIVES TRACE PORTALS (ETP)

The Explosive Trace Walk-through Portal (ETP) enables the detection of a broad spectrum of concealed explosives. This device is similar to the metal detector in terms of walking through an arch. However, the ETP requires the passenger being "searched" to pause momentarily in the archway. The ETP machine can be one of the heaviest components of the SSCP. Floor structure must be provided or reinforced to support the weight, and electric power provided. An air compressor is a key component of the ETP and depending on the manufacturer; the compressor may be physically separate from the unit itself. For maintenance and access to key components of the device, it is recommended to provide approximately 8" of overhead clearance and 24" of side clearance for opening of access doors and general working space. Dimensions, weight and power requirements vary depending on manufacturer and model. Refer to **Figure 2-15** for a typical ETP unit.

<u>Note</u>: Allow a minimum of 24" clearance on each side of ETP for service and maintenance functions and a minimum of 8" on top for proper airflow.

Manufacturer	Model	Width	Depth	Height	Weight	Power (220 VAC)
Smiths	Sentinel	74	55	90	1775	208/220 VAC, 40A, 50/60 Hz
GE	EntryScan	48	40	102	631	220-240V, 20A, 50/60 Hz, single phase

Figure 2-15. Space Required for Typical ETP

2.1.9 H/I – PASSENGER CONTAINMENT AND INSPECTION

The passenger containment and inspection modules are constructed with flexibility and modularity in mind. Typical holding and wanding station configurations are constructed from standard, interchangeable 4'x 6' modular tempered glass panels. This feature provides the ability to rapidly reconfigure a containment/inspection station by simply rearrangement of the modular panels. A holding station can quickly be modified by adding or removing standard 4' panels per the checkpoint requirements.

2.1.9.1 Holding Stations

A holding station differs from a wanding station in that it is created specifically to hold passengers temporarily until TSOs are available to escort them to the proper area to conduct secondary screening.

The holding station must be positioned so passengers can be diverted directly into the area without obstructing the path of non-alarming passengers, and must prevent the passing of prohibited items to sterile passengers.

Holding stations should be a minimum of 8' in length and 3' in interior width. Up to three passengers can be held simultaneously in an 8' configuration.

Holding station walls shall be designed and constructed per the wanding station criteria outlined in **Figure 2-16**.

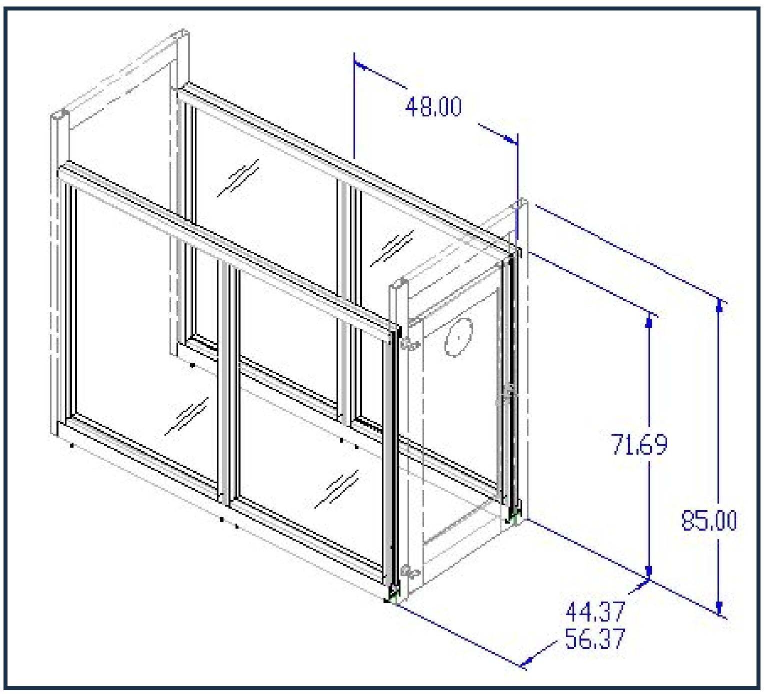


Figure 2-16. Typical Holding Station

2.1.9.2 Holding/Wanding Stations

A holding/wanding station is created to enable both holding and wanding of passengers who have alarmed the WTMD and/or require additional screening via a Hand Held Metal Detector (HHMD or "wand") in a single area. Generally, space limited checkpoints will benefit from holding/wanding stations.

The holding/wanding station must be positioned so passengers can be diverted directly into the area without obstructing the path of non-alarming passengers, and must prevent the passing of prohibited items to sterile passengers.

Holding/wanding stations should be a minimum of 8' in length and 3' or 4' in interior width. Up to three passengers can be held simultaneously in an 8' configuration.

Figure 2-17 is an example of a typical holding/wanding station.

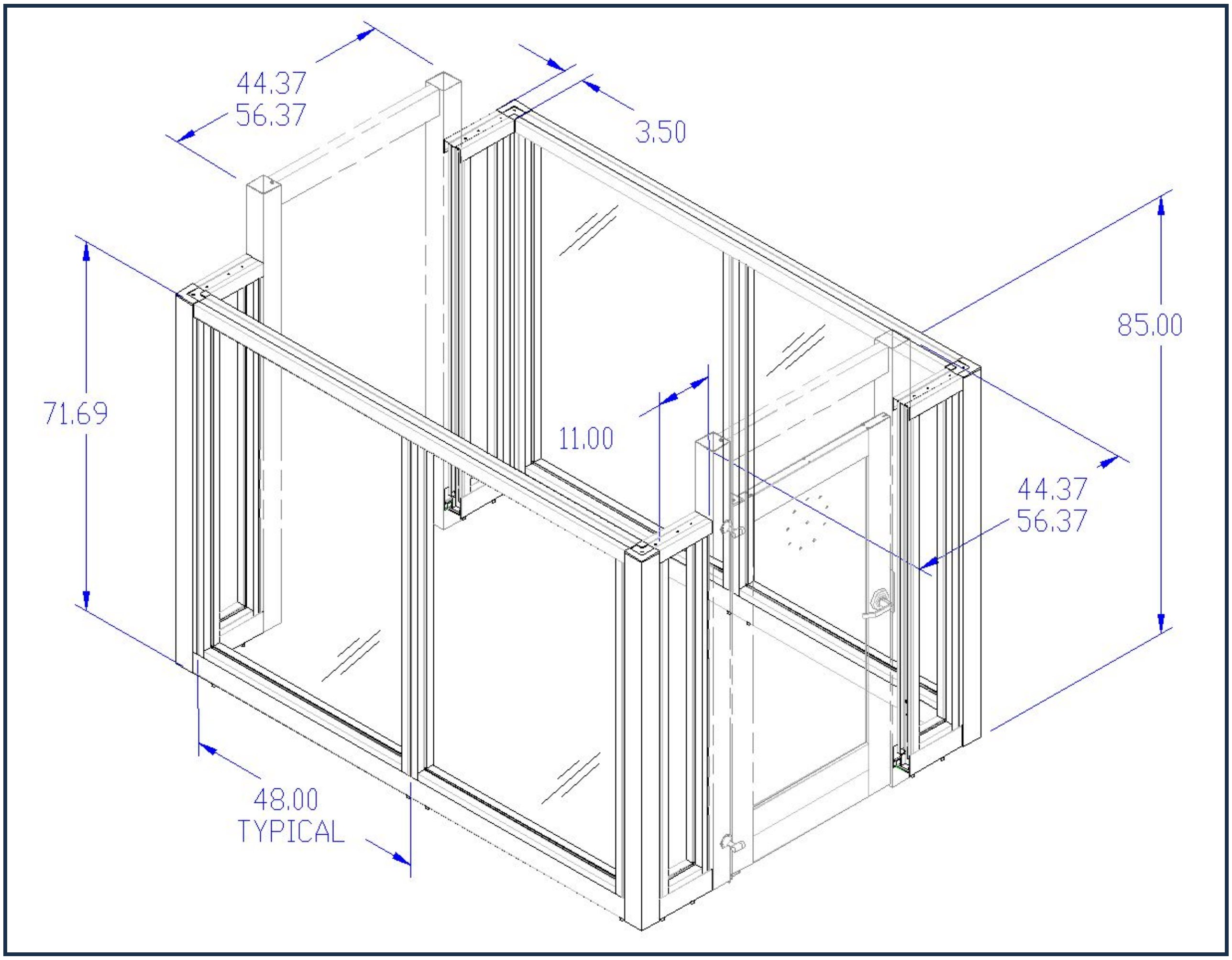


Figure 2-17. Typical Holding/Wanding Station

2.1.9.3 Wanding Stations

Wanding stations are used to separate passengers who have alarmed the WTMD and/or require additional screening via a Hand Held Metal Detector (HHMD or "wand"). Such stations must prevent the passing of prohibited items to passengers in the sterile side of the checkpoint. The station must be positioned so passengers can be diverted directly into the area without obstructing the path of cleared passengers. **Figure 2-18** is an example of a 16' wanding station. A typical wanding station is approximately 12' in length as referenced in **Figure 3-3**.

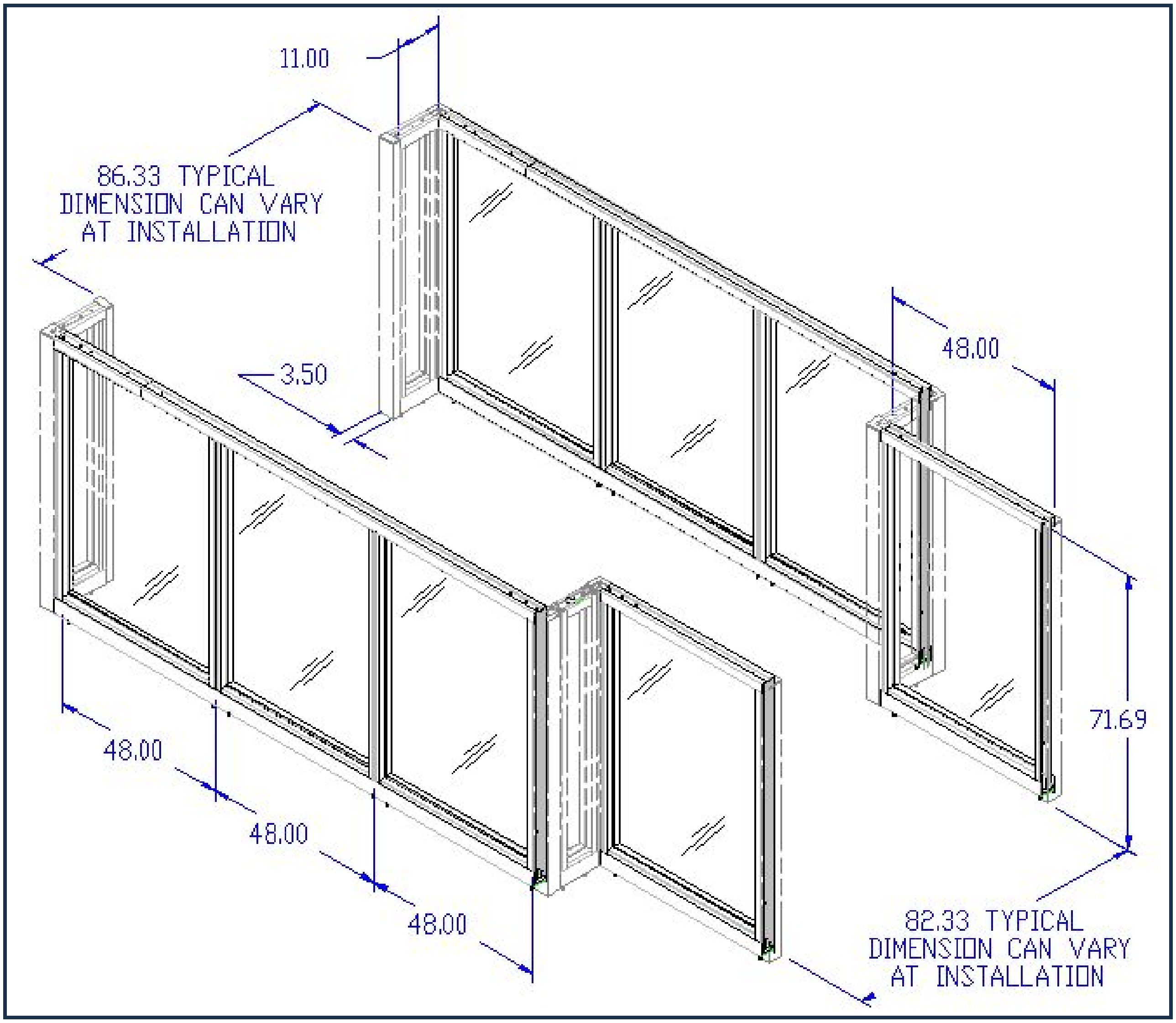


Figure 2-18. Typical Wanding Station

Wanding stations should include a minimum of a 4' long entry channel to allow queuing space for passengers waiting to be screened. Without this "waiting area", the main screening lanes would need to be halted whenever the wanding station becomes filled.

Up to three passengers can be screened simultaneously in the typical configuration as illustrated in the wanding station diagram above.

Wanding station walls should be fastened flush with the floor and be 6' high. The structure must be self-supporting to eliminate the need for structural supports that may pose tripping hazards to passengers. Wanding stations should be constructed primarily of transparent materials so passengers can maintain visual contact with their baggage. The amount of metal, particularly steel, within the structure should be minimized to reduce interference with the HHMDs. Most wanding stations include reinforced corner brackets, solid aluminum top caps, and have bottom kick plates. The length and type of anchor bolts should be suitable to the local floor conditions. Wanding station walls may be custom designed to these criteria, or obtained from TSA approved manufacturers.

Exit doors from the wanding station on the sterile side are strongly suggested, and should be designed to contain passengers until screening is completed.

2.1.9.4 Long Neck Wanding Stations

For width-constrained checkpoints, the 2 or 3 -passenger wanding station can be modified to a linear configuration. In addition to the 4' long neck, a linear configuration requires 6' of length per passenger and 7' of width to ensure operability. Refer to **Figure 2-19** for layout and an example of a typical long neck wanding station with dimension information.

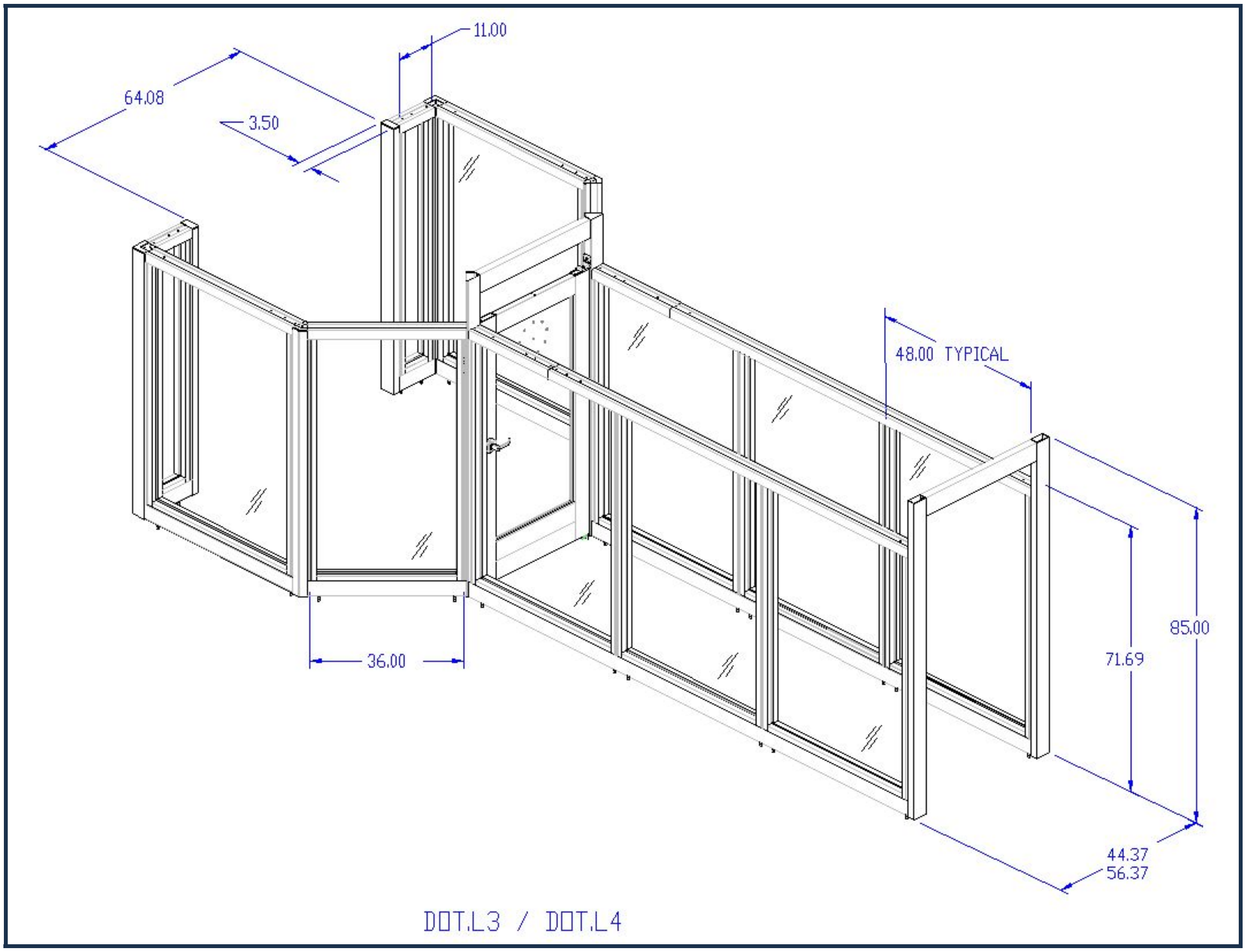


Figure 2-19. Typical Long Neck Wanding Station

2.1.10 J – NON-METALIC BARRIERS

In order to prevent passengers and items from passing into the sterile area without being screened by an ETP or WTMD, barriers must be installed to close all gaps exceeding 15" across the front width or façade of the checkpoint. These barriers should be constructed from primarily non-metallic materials, and be rigid enough to prevent vibrations that could interfere with the WTMD. Barriers must be flush with the floor and extend to a minimum height of 48". They also must be self-supporting to reduce any potential hazard to the people passing through or near the checkpoint. It is recommended that barriers be constructed primarily of a transparent material. Standard barriers come in 2', 3' or 4' widths, but may also be custom designed. Refer to **Figure 2-20** for an example of a 4' non-metallic barrier.

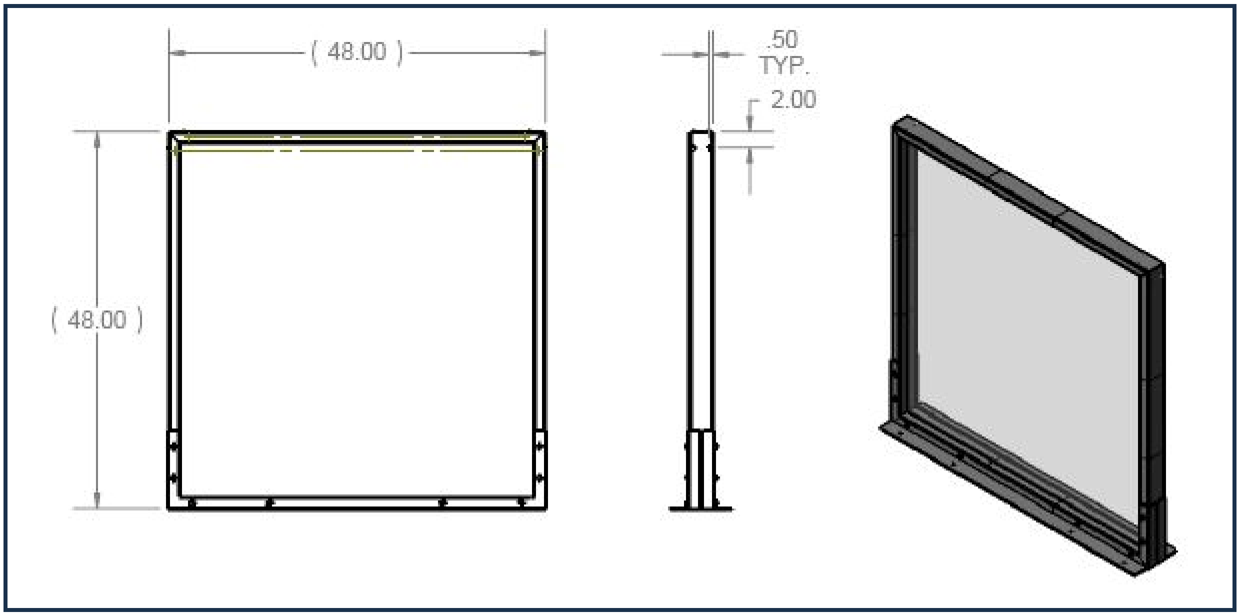


Figure 2-20. Example of a 4' Non-metallic Barrier

2.1.11 K – NON-METALLIC ADA GATE/ACCESS

Access through the checkpoint screening process for disabled passengers must be provided. As WTMDs are typically not wide enough to meet the Americans with Disabilities Act (ADA) requirements, a gate or other passageway must be provided next to at least one WTMD so passengers in wheelchairs can be directed into the wanding or holding station for security screening. Limited use of metal should be considered when designing/fabricating ADA gates because of the possibility of interfere with nearby WTMDs. See **Figure 2-21** for an example of a typical ADA Gate used at a SSCP.

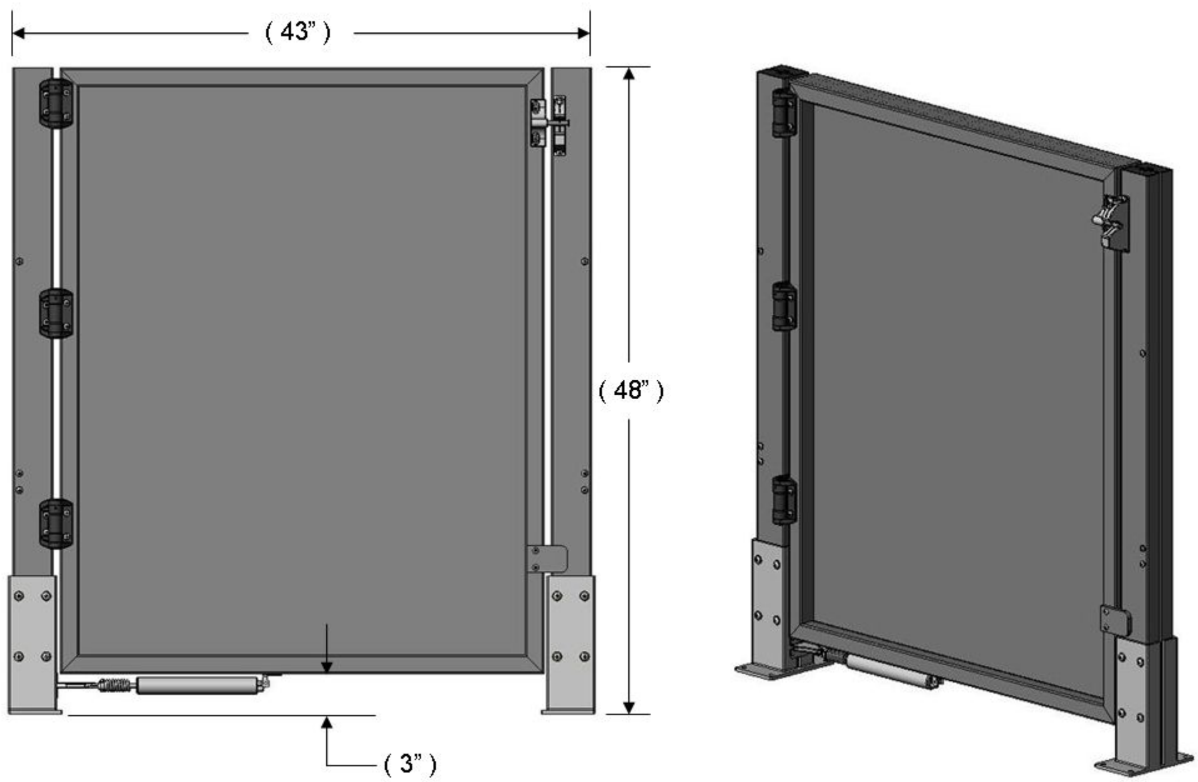


Figure 2-21. Typical ADA Gate

When planning a new checkpoint design and construction, the use of the exit lane for wheelchair access to the sterile area is not an acceptable alternative. ADA exit lane access or the use of special ADA passageways must be defined during the initial planning engagement effort. The swing direction of the ADA gate should conform to local codes. Most approved ADA gates are 45" wide, with a 36" interior swing gate made of non-metallic, primarily transparent material.

2.1.12 L – SSCP ADJACENT WALLS/BARRIERS

Walls surrounding the security checkpoint must be a minimum of 8' high. Ideally, walls that separate sterile areas from non-sterile areas should be floor to ceiling, and designed without gaps so that no prohibited items could be placed into the secure side of the terminal when the SSCP is closed. Exit lane walls adjacent to the checkpoint are to be 8' minimum and constructed of transparent material where possible. Where possible, walls or other barriers adjacent to X-ray TSO should prevent public view of the X-ray monitor screen.

2.2 SUPPLEMENTARY CHECKPOINT EQUIPMENT

2.2.1 EGRESS SEATING AREA

Planners and designers should allow for sufficient floor space to accommodate a seating area after the passenger completes a screening process. This area may be after each lane, module or combination there of. Passenger safety and flow should be considered with the location and position of any seating.

2.2.2 LAW ENFORCEMENT OFFICER STATION

A law enforcement officer (LEO) station may be positioned at the rear (sterile side) of the checkpoint to enable the LEO to view the entire screening operation. Positioning of the station so the LEO has an unobstructed view of as much of the checkpoint as possible is critical to the LEO's ability to identify and respond to situations that may develop in the checkpoint. After working with the FSD, there are alternatives to having an LEO station at the SSCP.

2.2.3 SUPERVISOR STATION

The Supervisory Transportation Security Officer (STSO) should have access to a workspace – a podium at a minimum – positioned at the rear of the checkpoint to enable the STSO to view the entire screening operation. If there is an LEO station at the checkpoint, the STSO can be located adjacent to the LEO station. See **Figure 2-22** for an example of a typical STSO podium.

Figure 2-22. STSO Podium

2.2.4 SPACE FOR TSA STAFF

Accommodation should be made for TSA staff space, both for storage of personal items and for breaks. This area should not be accessible to the public.

2.2.5 PRIVATE SCREENING AREAS

A private screening area must be made available to accommodate passengers who request a private screening. This area must provide complete privacy and at a minimum, sufficient space for one passenger, two TSOs, a chair and a search table. Also consider space accommodations for passengers with disabilities, escorts, interpreters, and LEO(s). The private screening area can be either a modular paneled system (see **Figure 2-23**) or a private room adjacent to the checkpoint. In limited cases, a curtain may be used.

Figure 2-23. Modular Paneled Privacy Room

2.2.6 CCTV COVERAGE

Cameras can increase the public's sense of security, deter theft, and capture visual records of security activity, including breaches. In this type of application, correct placement of a sufficient number of cameras to ensure complete coverage of all lanes, search tables, ETD tables, and exit lanes, when co-located, is critical. Refer to TSA's Recommended Security Guidelines for Airport Planning, Design and Construction, Part III. For example, a camera that can only show the back view of a person breaching the SSCP is of very limited value, as opposed to a camera that displays a person's face and other identifying characteristics. Additionally, CCTV can monitor unmanned or closed SSCPs and adjacent areas for greater security. CCTV placement must not intrude on the passenger's privacy.

2.2.7 DATA CONNECTIONS/CABINET

Connections must be provided to connect security equipment to Local Area Networks (LANs), phone lines, remote screening rooms, the STSO desk and other selected points within the airport. Eventually, data from all screening equipment and trace machines will be collected automatically. Many airports undertaking new construction may choose to install an information infrastructure, to which the SSCP data may be linked. The security infrastructure may be a separate system from the data infrastructure, protected by firewalls.

2.2.8 HI-SOC

High Speed Operational Connectivity (Hi-SOC) provides high speed connectivity to Federal Security Directors (FSD's) and their airports. Hi-SOC will increase efficiency and effectiveness of screening operations while having real time communications with all other TSA owned mission spaces including screening areas, baggage areas and administrative spaces. Additionally, security breaches can be quickly shared with other checkpoints within the airport and with other airports so as to detect multiple concurrent incidences. TSA airport staff will be able to access the TSA Online Learning Center and training programs such as "Threat of the Day", a training program that allows TSOs to stay abreast of the most current security threats. Hi-SOC also allows for cost-effectively satisfying mandated training requirements.

The following are the recommended general guidelines for Hi-SOC installation:

1. All new cable plant installations will employ plenum-rated CAT6 cabling. Augmentation of existing CAT5e cable plants will utilize CAT5e cabling.
2. All checkpoint lanes will receive one (1) Quad drop, which consists of four (4) RJ45 connections.
3. A patch cable will be provided to connect each TRX machine to one of the nearest drops.
4. All Electronic Trace Detection (ETD) devices will receive one (1) Dual drop, which consists of two (2) RJ45 connections.
5. All Explosive Detections System (EDS) devices will receive one (1) Dual drop, which consists of two (2) RJ45 connections.
6. All Explosive Trace Portal (ETP) devices will receive one (1) Dual drop, which consists of two (2) RJ45 connections.
7. All Electronic Time and Attendance (ETA) locations will receive one (1) Single drop, which consists of one (1) RJ45 connection.
8. All TSA PC workstations will receive one (1) Dual drop, which consists of two (2) RJ45 connections.
9. All TSA network printers will receive one (1) Single drop, which consists of one (1) RJ45 connection.
10. All TSA Training PC workstations will receive one (1) Single drop, which consists of one (1) RJ45 connection.

2.2.9 SSCP LIGHTING

Lighting requirements in new/renovated security checkpoints areas should meet local code requirements, and ideally will meet the minimum illuminance level of 30 foot-candles (fc) requirements as defined by ANSI/IESNA RP-104. The minimum lighting level should be 30fc or local building code if greater in all screening checkpoint areas. Similarly sufficient lighting is required for any area in which a CCTV camera is intended to monitor activity. Lighting enhancements, other than the relocation of a few existing fixtures, are outside the scope of the checkpoint design. TSA direction is required for any new fixtures.

It may also be necessary to install or relocate task lighting for ETD search tables. If new task lighting is needed, a standard ETD task lighting material list is available from the Safety Hazard Mitigation Section, Chief Technology Office. Availability of electrical circuits and receptacles for task lighting must also be taken into account.

2.2.10 WIRELESS ACCESS POINT

Data and power outlets for a wireless data point should be positioned, when possible, at a central point with line-of-sight to the checkpoint and queuing area. Outlets should be a minimum of 8' above the floor or in the ceiling, with the ceiling being the preferred location. The associated electrical duplex and data jack should be co-located when possible. There should be one wireless access point for each checkpoint (not each lane). The wireless protocol or model of the wireless devices has not been specified by TSA at this time.

2.2.11 EXIT LANE COMPONENTS

2.2.11.1 Exit Travel Lane

A travel lane should be adequately sized for deplaning traffic flow exiting the concourse. This lane must be sized to meet building code egress path width requirements. The location and size of the exit travel lane should be considered carefully to support good flow, clear way finding, and enhanced security.

Some airports have incorporated special measures, such as revolving doors or turnstiles, capable of blocking entry from the public side while permitting egress for those departing the sterile area. This must also allow sufficient space for the passage of passengers with baggage, and accommodate the disabled.

Control and design of travel and exit lane areas may be affected by the party or element having operational responsibility to ensure unauthorized entry into the area does not occur. The requirements may vary if it is the airport operator, air carrier or TSA which has total or shared control of these lanes.

2.2.11.2 Exit Lane Station

An exit lane station is an area, often equipped with a table and chair or podium, for a security person to monitor and deter people attempting to bypass the SSCP by entering the sterile area from the public side through the exit lane. The security guard should be located to intercept traffic moving in “pass-on-the-right” patterns typical in the United States.

2.2.11.3 Length of Response Corridor – Exit Concerns

Downstream of the SSCP, a length of hallway may be dedicated to detection and detention of persons attempting to breach the SSCP. In earlier designs, the SSCPs were located close to airline boarding gates. When these conditions exist, consider adding see-through barriers between the SSCP and the gate, such as a substantial plastic or laminated glass wall or offset panels, so the SSCP can be observed to facilitate an immediate LEO response to an alarm. In new facility planning and design, consider separating boarding gates from the SSCPs to provide adequate time for response to a breach of the SSCP. The area might also incorporate CCTV surveillance so that breaches may be monitored until the incident is resolved.

In all cases, breach alarms should be installed both at existing SSCPs and wiring at locations that may be designed to house future SSCPs. In this way aircraft, especially those located at more distant gates, can be quickly protected by the immediate closure and locking of access doors and loading bridges upon alarm, and avoid delays resulting from a need to re-screen passengers or to conduct extensive security sweeps of the entire concourse/pier/terminal.

2.2.11.4 Exit Lane CCTV

Cameras are increasingly used to monitor the approach of pedestrian traffic attempting to enter the sterile area through the exit lane. Some camera systems are designed to record all traffic and send recently recorded information to predefined monitors if a breach alarm is activated.

2.2.11.5 Integrated Exit Lane Systems

As in the non-sterile to sterile movement components, there are integrated systems available for exit lanes. These allow video cameras, sensors, and video monitors, with supporting architectural elements, to be integrated into the overall SSCP systems, with centralized control.

2.2.11.6 Architectural Design to Support Intuitive Processes

Architectural features and lighting can play key roles in encouraging the successful operation of the SSCP. A floor color or material, for example, creating a large “entrance mat” ahead of the WTMD on the public side can clearly mark the area that is intended for queuing. By using a different floor material or color in front of the exit lane, it may become more intuitive to those on the non-sterile side that they are not supposed to go through the exit lane. Other material, spatial, or lighting clues may be used to reinforce appropriate paths throughout the SSCP.

3.0 FEATURES OF STANDARD SSCP LAYOUT DESIGN OPTIONS

The purpose of this section shows typical TSA Airport Checkpoint Design Layout Standards.

These SSCP examples facilitate procedures in an orderly, consistent manner, reducing mistakes and enhancing supervision and customer satisfaction. There are 9 approved layouts as depicted in **Figure 3.1** on the following page.

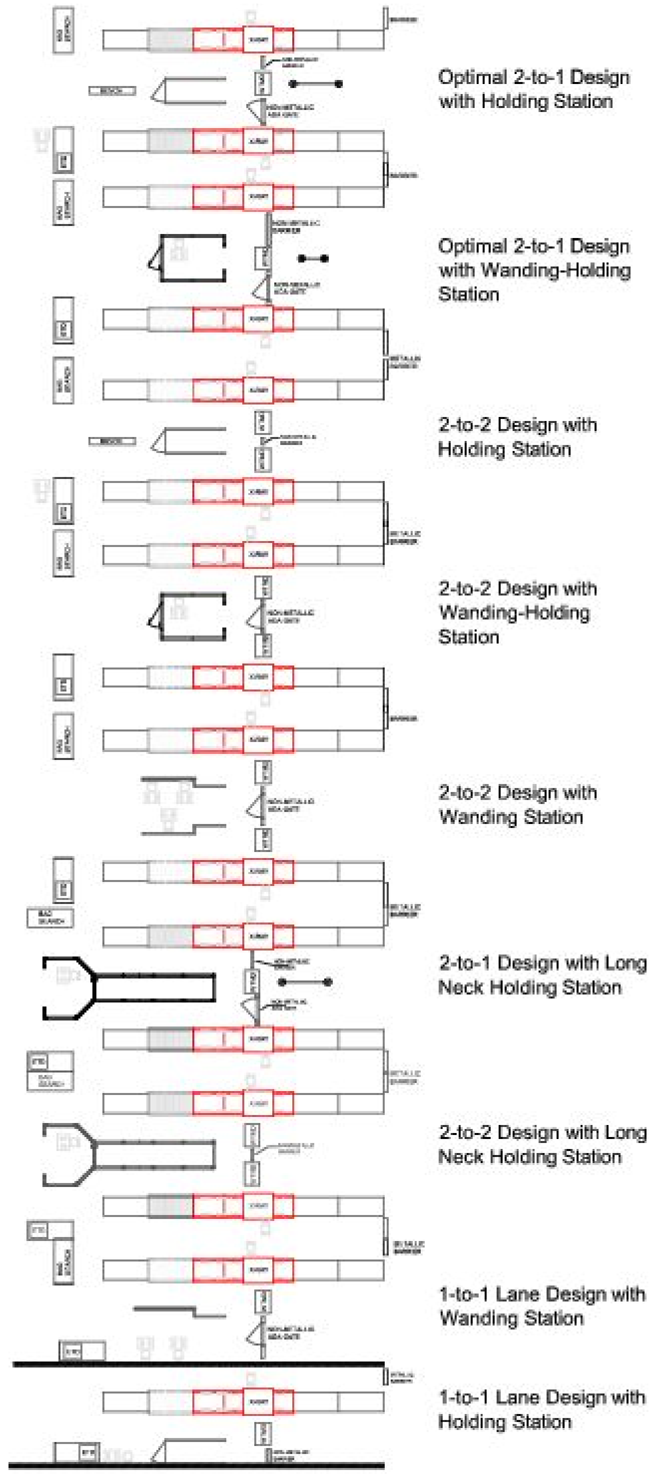


Figure 3-1. Combined 9 Standard Checkpoint Designs

Each airport's unique characteristics will determine which layout serves as the "best fit". Additionally, best practices have determined that the "optimal" layout is the 2 to 1 configuration and should be utilized wherever possible.

Throughout the design process, the FSD needs to be an integral member of the design team as they will be able to provide specific design considerations and best operations practices that will serve to optimize the entire process. Advantages and disadvantages of each of the 9 design layout options are summarized in **Figure 3-2** below.

Design Layout	Page No.	Dim. (LxW)	Advantages	Disadvantages
2-to-1 with Holding Station & 2-to-2 with Holding Station	41 43	46'x23' 44'x25'	Overall width is only 22 feet and allows TSOs greater flexibility to work among different checkpoint lanes.	Slight increase in checkpoint depth for secondary screening area.
2-to-1 with Holding/Wanding Station	42	44'x25'	Overall width is only 25 feet and allows TSOs greater flexibility to work among different checkpoint lanes.	Increased depth (2.5 – 3 feet) for secondary screening area.
2-to-2 with Holding/Wanding Station	44	44'x25'	The ability to utilize the holding/wanding station for multiple uses, including body searches. Also enables passengers to be easily diverted to the holding/wanding station for immediate secondary screening or containment.	Only one passenger can be screened at a time with limited queue space (up to 1).
2-to-2 Wanding Station	45	44'x27'	Open spacing that allows for easy passenger flow. Selectees or WTMD alarms can be easily be diverted into the wanding station for immediate secondary screening.	Requires the greatest amount of floor space.
2-to-1 Long Neck Wanding Station & 2-to-2 Long Neck Wanding Station	46 47	47'x23' 47'x23'	Minimum width is needed and has the attached wanding station for immediate secondary screening.	Additional glass required for the elongated neck and causes a restriction in the composure area space.
1-to-1 Single Lane Holding Station	48	43'x13'	Small amount of floor space needed for the width of the lane.	Small amount of space available for additional technology if necessary.
1-to-1 Single Lane Wanding Station	49	44'x17'	Secondary screening passengers can easily be diverted into the wanding station for immediate screening.	Amount of width needed to accommodate the wanding station.

Figure 3-2. Advantages/Disadvantages of Design Layout Options

3.1 SSCP SPACING REQUIREMENTS

Typical minimum clearance dimensions for each piece of equipment in an optimized TSA SSCP are shown in **Figure 3-3**. TSA approval is required for any deviations from these requirements. **Figure 3-4** on the following page illustrates an example checkpoint layout and the associated minimum spacing requirements between respective equipment and furniture pieces as outlined in the table below.

Min. Spacing	Description
3'	Min. Distance From X-ray Hood to Wall
4'	Min. Spacing between back-to-back X-ray dome
12"	Clearance between WTMD/EMD and X-ray, barriers/ADA Gate, Walls, columns, and all other equipment. Barriers should be installed to close gaps greater than 15. Barriers of non-metallic materials should be used as they have no effect on the operation of the EMD.
3'6"	Distance between X-ray roller table and Glass Wanding Station.
4'	Distance between WTMD/EMD and start of Wanding Station Neck.
4'	Distance between WTMD/EMD and Holding Station.
6'	Interior Width of standard two-lane Wanding Station.
3'	Interior Width of Holding Station.
6'	Min. Length of single lane (one sided) Wanding Station.
4'	Min. Length of Wanding Station Neck.
4'	Min. Length of Holding Station. Note: Typical is 8'.
12'	Approximate Length of Wanding Station screening area.
4'	Min. Space between ETD table and end of X-ray roller table
3'	Min. Opening for ADA gate. Total outside width of ADA gate with posts is 3' 9".
6' 6"	Min. Distance from WTMD to ETP.
1' 6"	Min. Clearance for ETP side panels for service and maintenance functions.
6"	Min. Clearance on-top of ETP for air flow.

Figure 3-3. Typical SSCP Spacing Requirements

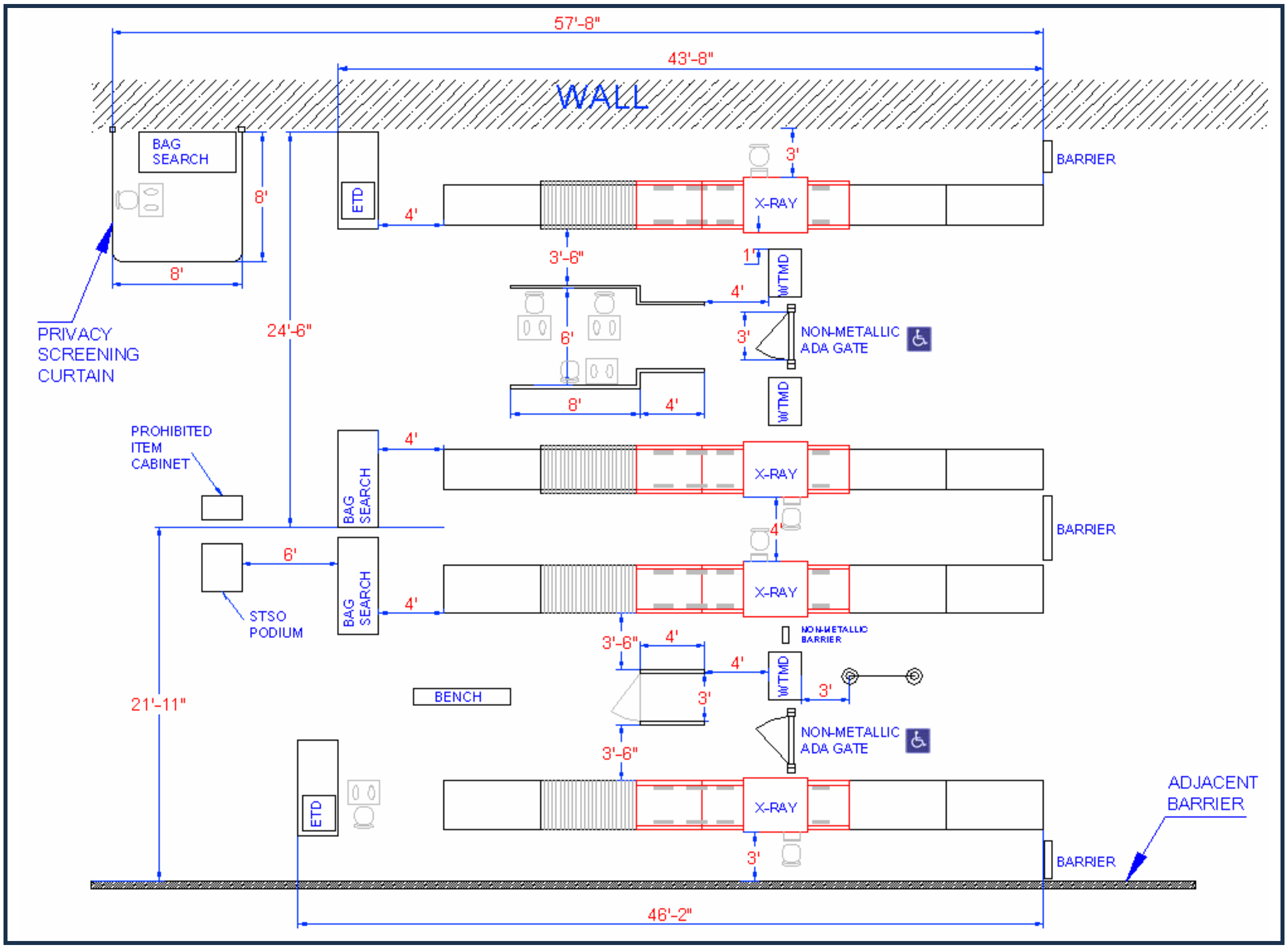


Figure 3-4. Example Layout of SSCP Minimum Spacing Requirements

3.2 TSA APPROVED LAYOUTS

3.2.1 2-TO-1 DESIGN WITH HOLDING STATION

Please refer to **Figure 3-5**. This is a standard and optimal TSA design that is becoming more prevalent. This configuration consists of one WTMD centered between two X-ray units. The holding station is centered directly (4') from the WTMD. The holding station is used as a containment area until a TSO becomes available to conduct secondary screening. This TSO escorts the passenger from the holding station to an area designated for secondary screening.

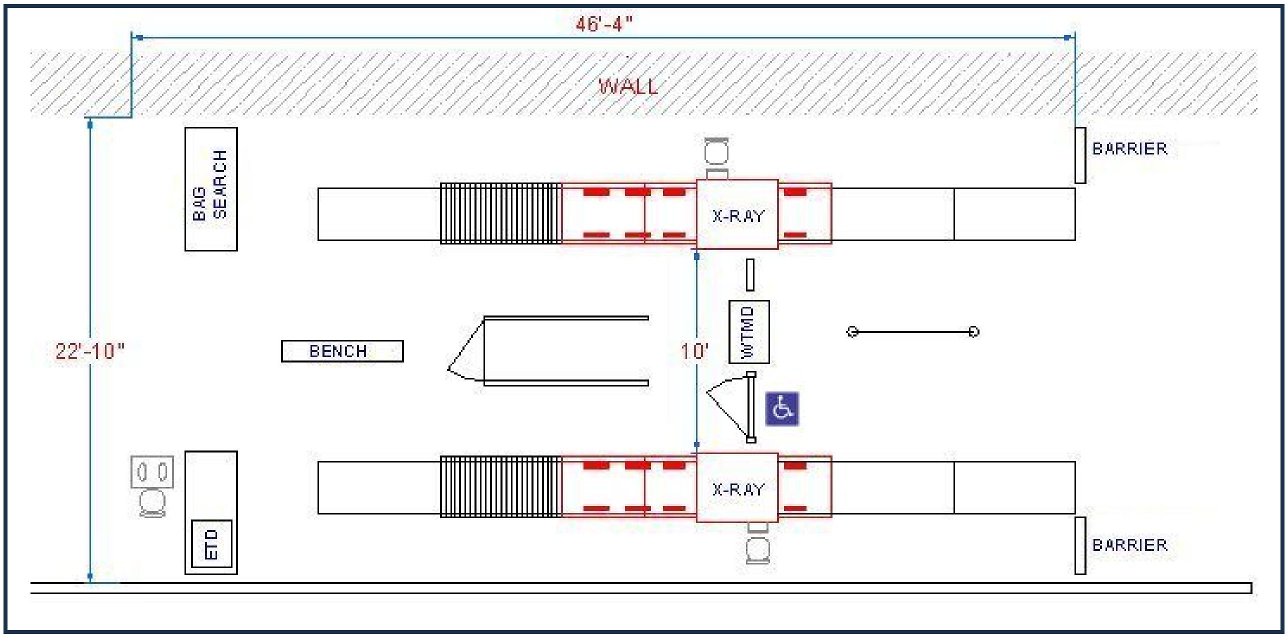


Figure 3-5. 2-to-1 Design with Holding Station

Consideration is needed to ensure that the depth of the checkpoint supports divest and composure tables, as well as the area necessary to conduct secondary screening. It is important that a stanchion be placed 3 feet in front of the WTMD that separates passengers in each lane. Without this stanchion, the two lines tend to intermingle and become inefficient and insecure. Separating the two lanes is advantageous because when one lane's throughput stops, due to passengers recomposing or other issues, the WTMD TSO can still permit passengers from the unaffected lane to flow through the WTMD.

- The advantage of this design is the fact that overall width is only 22 feet. This design also allows great flexibility for TSOs to work among different checkpoint lanes.
- The disadvantage of this design is the slightly increased depth needed for the secondary screening area.

3.2.2 2-TO-1 DESIGN WITH HOLDING/WANDING STATION

Please refer to **Figure 3-6**. This is a standard and optimal TSA design that is becoming more prevalent. This configuration consists of one WTMD centered between two X-ray units. The holding station is centered directly (4') from the WTMD. The holding station is used as a containment area until a TSO becomes available to conduct secondary screening. The TSO can either screen the passenger inside the holding station or escort the passenger to an area designated for secondary screening. This TSO escorts the passenger from the holding station to an area designated for secondary screening.

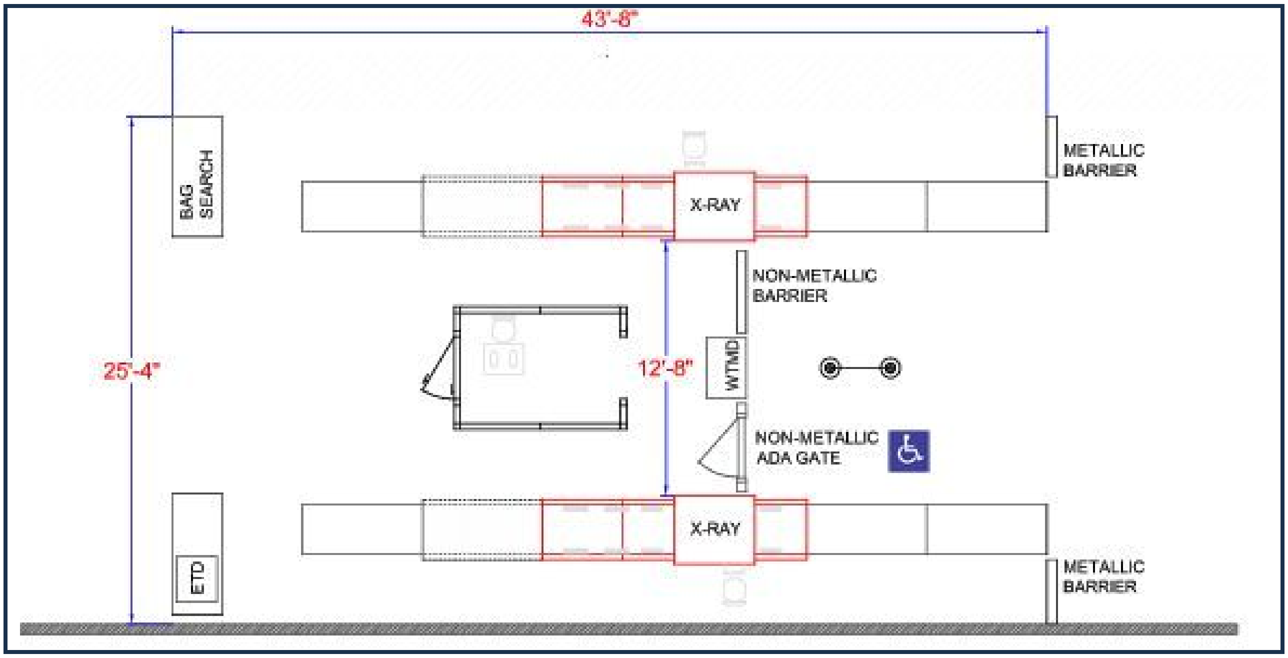


Figure 3-6. 2-to-1 Design with Holding/Wanding Station

Consideration is needed to ensure that the depth of the checkpoint supports divest and composure tables, as well as the area necessary to conduct secondary screening. It is important that a stanchion be placed 3 feet in front of the WTMD that separates passengers in each lane. Without this stanchion, the two lines tend to intermingle and become inefficient and insecure. Separating the two lanes is advantageous because when one lane's throughput stops, due to passengers recomposing or other issues, the WTMD TSO can still permit passengers from the unaffected lane to flow through the WTMD.

- The advantage of this design is the fact that overall width is only 25 feet. This design also allows great flexibility for TSOs to work among different checkpoint lanes.
- The slight disadvantage of this design is the increased depth (2.5 - 3 feet) needed for the secondary screening area.

3.2.3 2-TO-2 DESIGN WITH HOLDING STATION

This is the same design concept as the standard 2-to-1 Design with Holding Station (see **Figure 3-7**), with an additional WTMD.

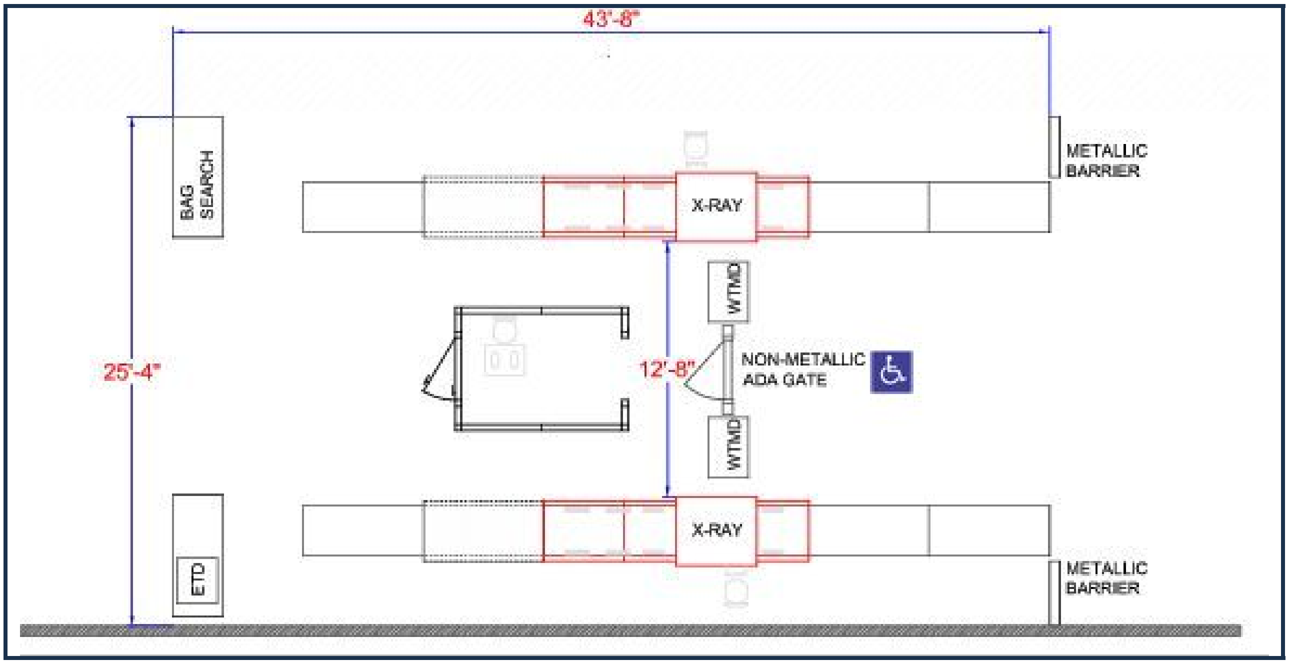


Figure 3-7. 2-to-2 Design with Holding Station

3.2.4 2-TO-2 DESIGN WITH HOLDING/WANDING STATION

Please refer to **Figure 3-8**. This also is a new design that is becoming more popular at airports with checkpoints that are depth constrained. Each lane has one WTMD supported by one X-ray unit. The holding/wanding station is centered directly (4') from each WTMD. The holding/wanding station can be used as either containment or a secondary screening area. Each lane includes two divesting tables and one composure table; however the quantity or overall length of tables may increase depending on the type of passenger at the peak time of day. Passengers divest on the non-sterile (public) side, and the time they spend "composing" is significantly higher than the time spent waiting for items to go through the X-ray machine.

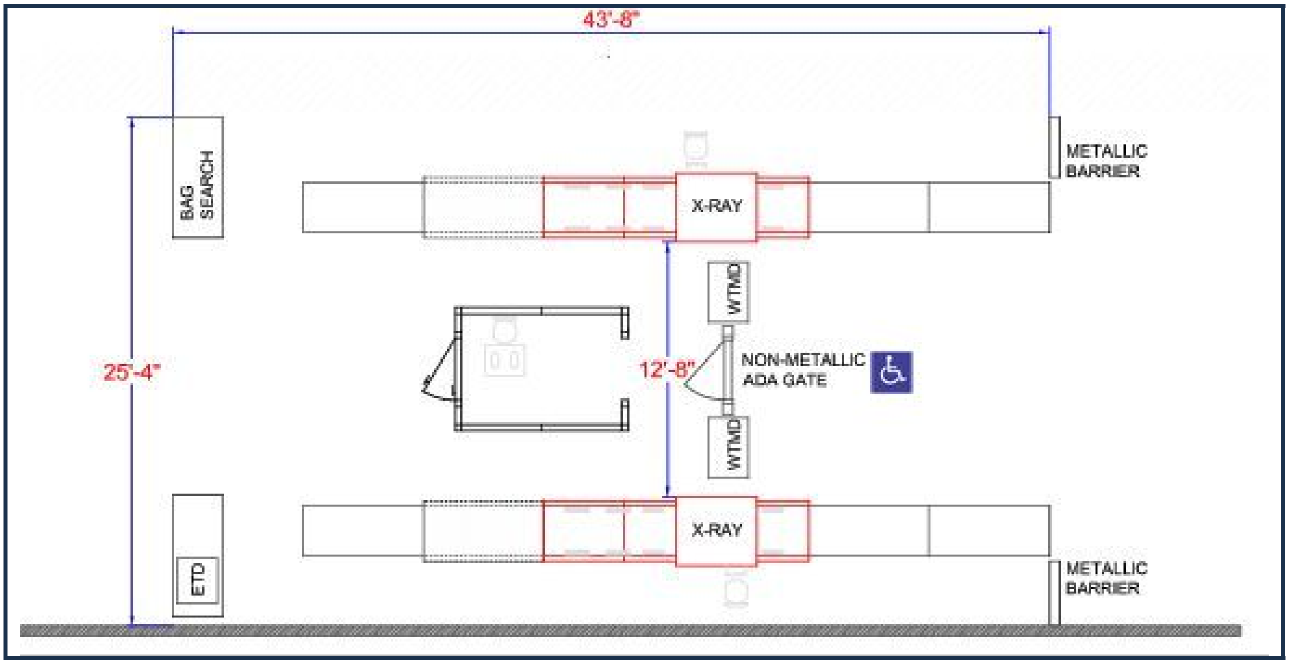


Figure 3-8. 2-to-2 Design with Holding/Wanding Station

- The advantages of this design are the ability to utilize the holding/wanding station for multiple uses including the ability to provide body searches. Additionally, this design enables passengers to be easily diverted to the Holding/Wanding station where they can undergo secondary screening immediately and/or be contained.
- The disadvantage of this design is that only one passenger can be screened at a time with limited queuing space (up to 1).

3.2.5 2-TO-2 DESIGN WITH WANDING STATION

Please refer to **Figure 3-9**. This is a very common early TSA design. Each lane has one WTMD supported by one X-ray unit. The wanding station is centered directly (4') from each WTMD. The wanding station is used as a containment and secondary screening area. Each lane includes two divesting tables and one composure table; however the quantity or overall length of tables may increase depending on the type of passenger at the peak time of day. Passengers divest on the non-sterile (public) side, and the time they spend "composing" is significantly higher than the time spent waiting for items to go through the X-ray machine. Special consideration is needed to ensure the depth of checkpoints can support divest and composure tables.

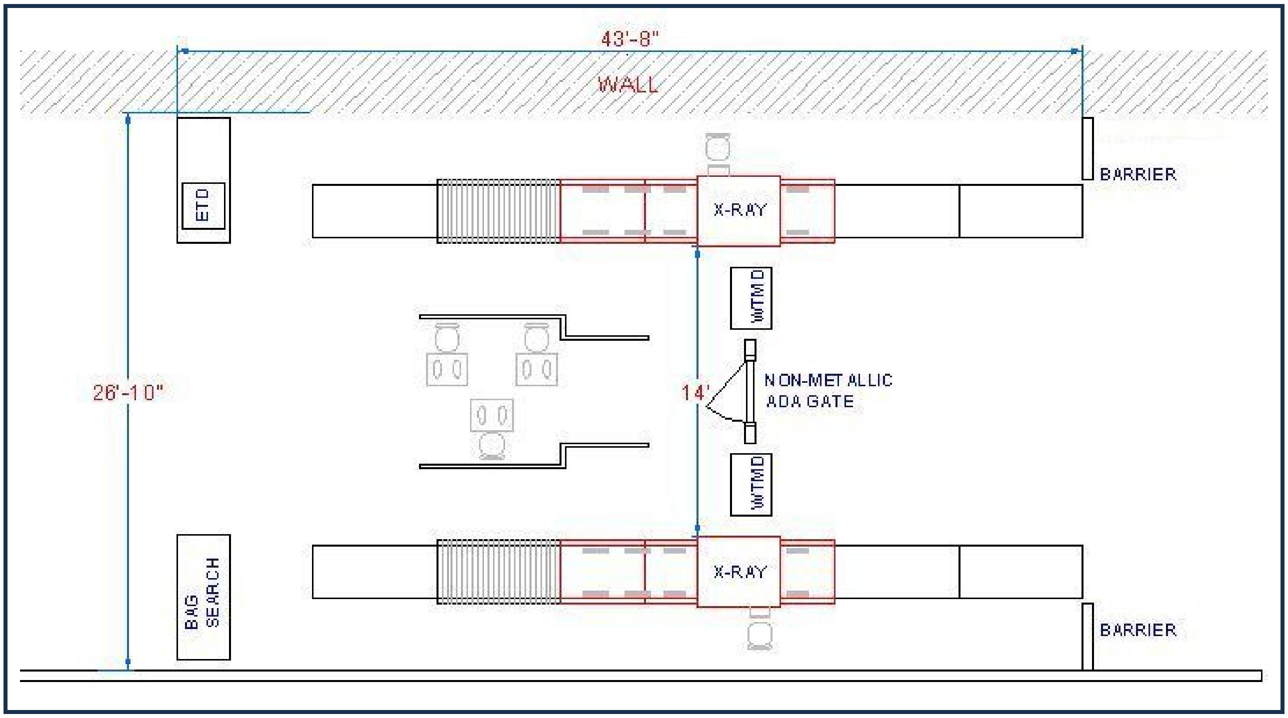


Figure 3-9. 2-to-2 Design with Wanding Station

- The advantages of this design include open spacing that allows for easy flow. Selectees or WTMD alarmed passengers can easily be diverted into the wanding station where they can undergo secondary screening immediately. The wanding station is located such that the passenger can easily maintain eye contact with his/her baggage.
- The disadvantage of this design is the fact that it requires the greatest amount of floor space.

3.2.6 2-TO-1 DESIGN WITH LONG NECK WANDING STATION

Please refer to **Figure 3-10**. This is the same configuration as a 2-to-1 Design with Holding Station (Figure 4-2); however there is an elongated neck, normally 9 to 12 feet long, on the front end of the wanding station. This neck is used to contain selectees and WTMD alarm passengers for secondary screening. The end of the neck is blocked by a door so the passenger cannot enter the wanding station until a TSO is available.

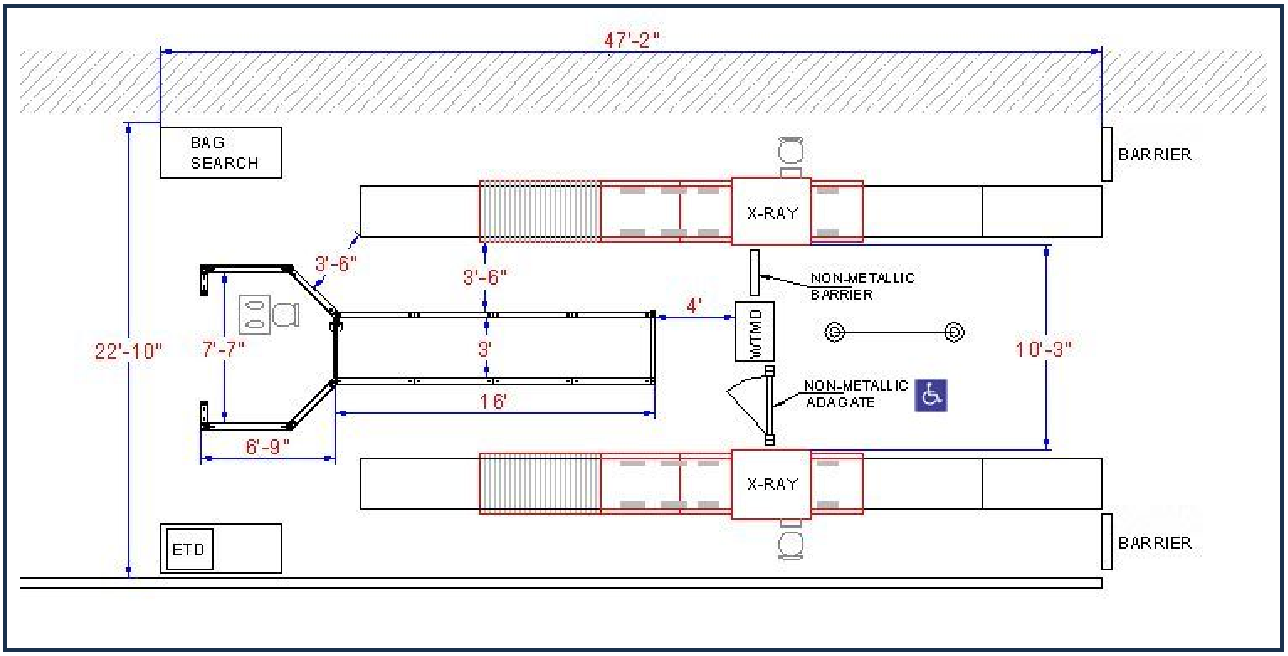


Figure 3-10. 2-to-1 Design with Long Neck Wanding Station

- The advantage of this design is minimum width needed and the attached wanding station for immediate secondary screening.
- The disadvantage of this design is the additional glass required for the elongated neck and the restricted space in the composure area.

3.2.7 2-TO-2 DESIGN WITH LONG NECK WANDING STATION

This is the same design concept as the standard 2-to-2 design with Wanding Station (see **Figure 3-11**), except incorporating a long neck wanding station.

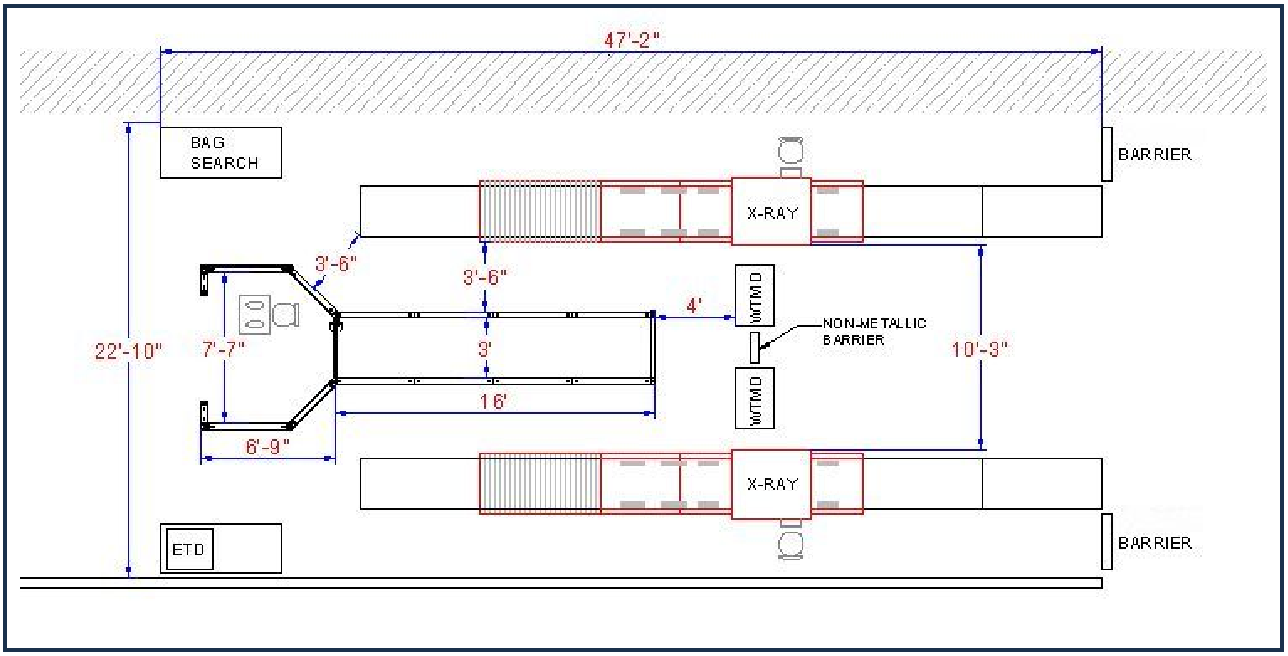


Figure 3-11. 2-to-2 Design with Long Neck Wanding Station

3.2.8 1-TO-1 SINGLE LANE DESIGN WITH HOLDING STATION

Please refer to **Figure 3-12**. This design is common in space-constrained areas or where a lane is added on either end of a checkpoint. The design consists of one WTMD and one X-ray unit. The holding station is most often created by a glass partition placed parallel to an existing airport wall. This design includes two divest tables and one composure table.

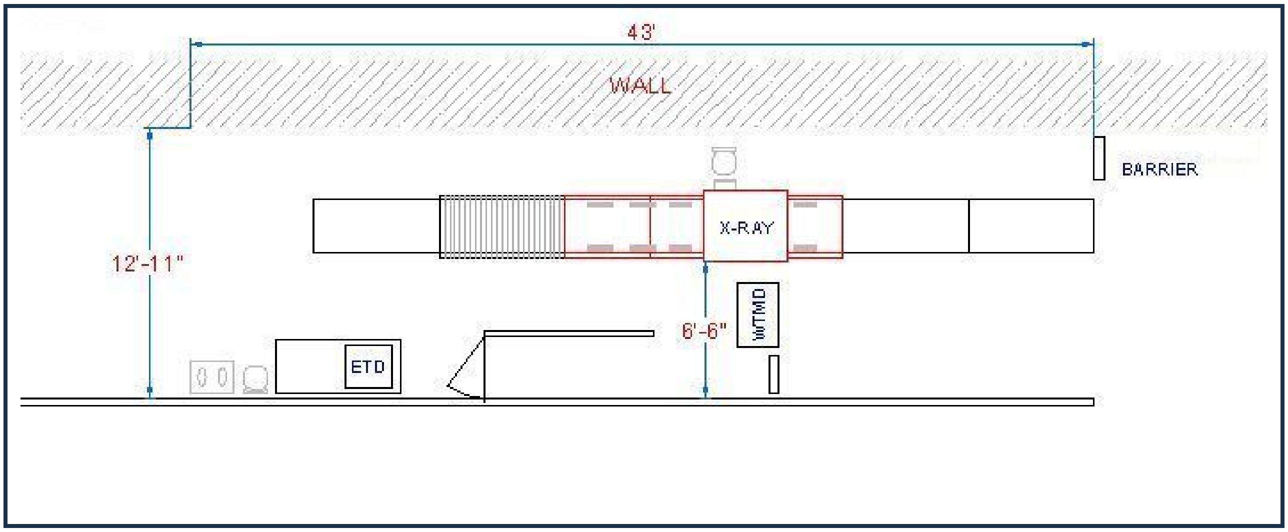


Figure 3-12. 1-to-1 Single Lane Design with Holding Station

- The advantage of this scheme is the small amount of floor space needed for the width of the lane.
- A disadvantage of this design is the small amount of space available for additional technology to be added.

3.2.9 1-TO-1 SINGLE LANE DESIGN WITH WANDING STATION

Please refer to **Figure 3-13**. This is a very common early TSA design for one lane. A wanding station is created by placing glass partitions parallel to an existing airport wall. Two or three positions for secondary screening are located in the wanding station.

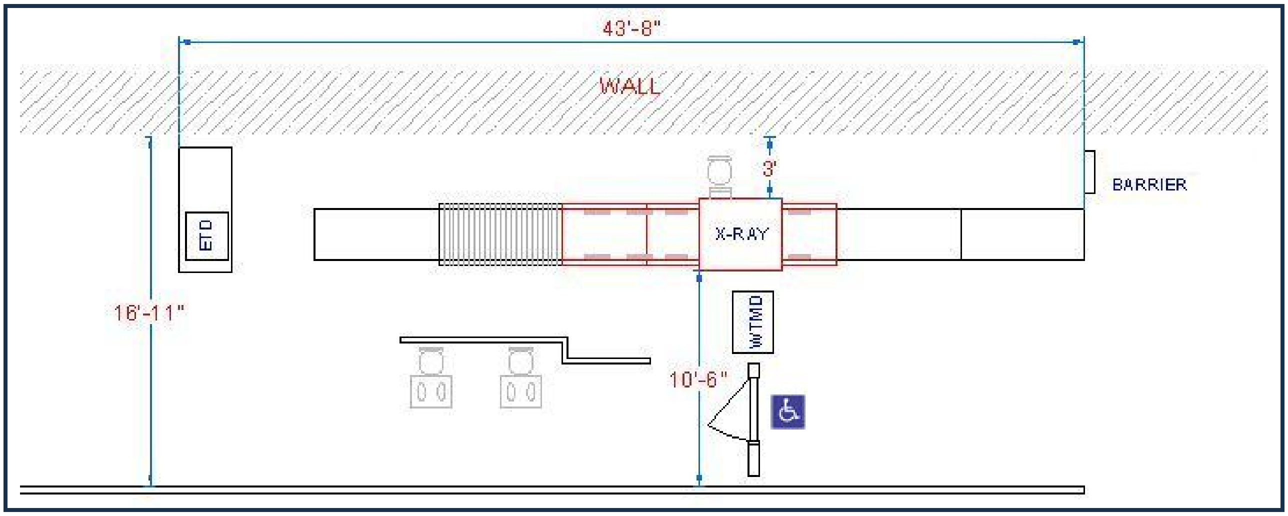


Figure 3-13. 1-to-1 Single Lane Design with Wanding Station

- An advantage of this design is the secondary screening passenger can easily be diverted into the wanding station where they can undergo screening immediately.
- A disadvantage of this design is the amount of width needed to accommodate the wanding station.

3.3 ALTERNATIVE LAYOUTS

3.3.1 2-TO-2 AND 1-TO-1 ETP DESIGNS WITH WANDING AND HOLDING STATIONS

Please refer to **Figure 3-14**. This layout illustrates notional checkpoint lane configurations for the inclusion of the ETP. One configuration shows a 2-to-2 design with wanding station and the other is a 1-to-1 design with holding station. The primary and optional placements are indicated on the figure. The ETP process is optimized by linear extension of the divestiture area.

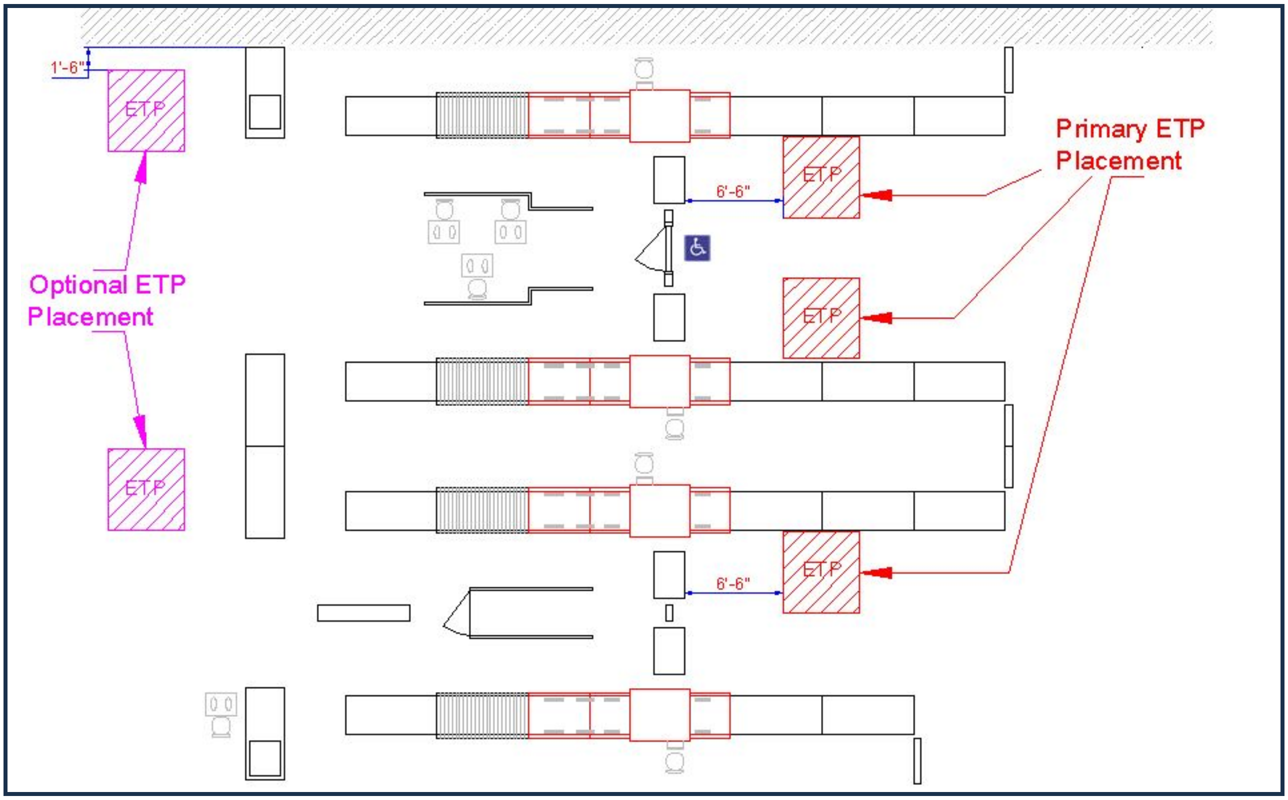
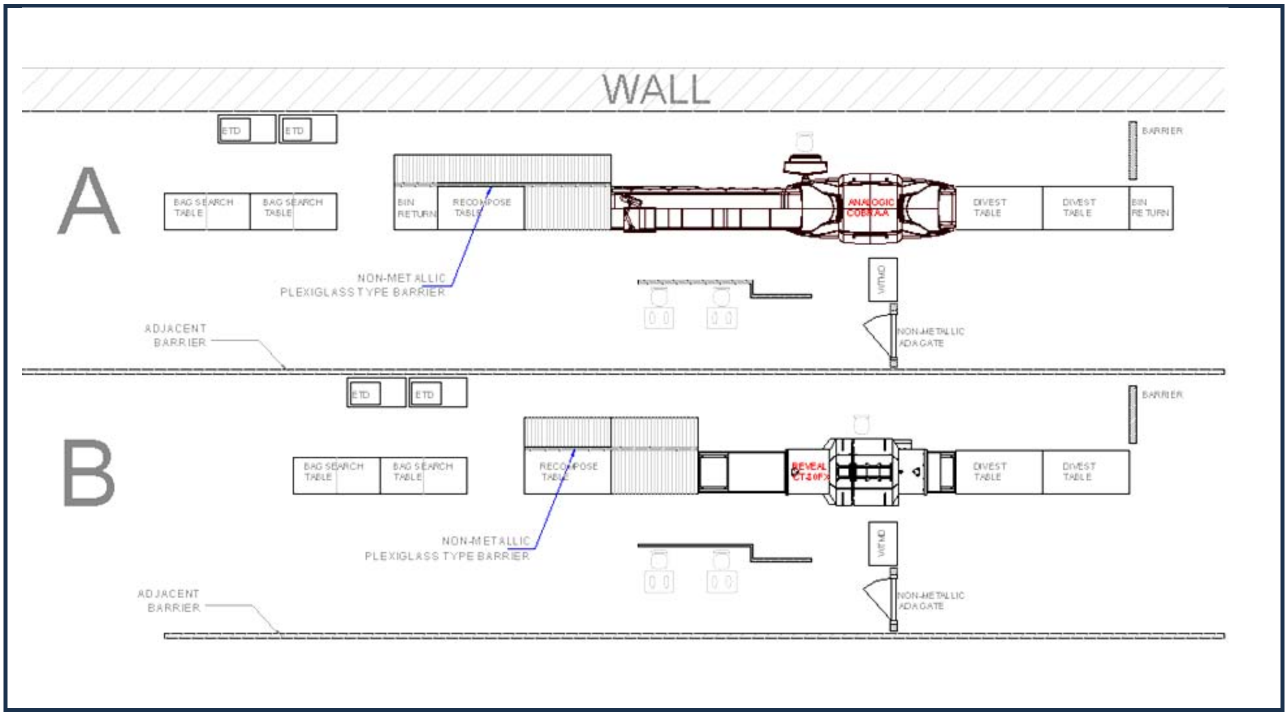


Figure 3-14. 2-to-2 and 1-to-1 ETP Designs with Wanding and Holding Stations

3.3.2 1-TO-1 CHECKPOINT EDS DESIGNS WITH HOLDING STATION

Please refer to **Figures 3-15, 3-16 and 3-17** for conceptual checkpoint layout designs incorporating checkpoint EDS. All three conceptual designs are single lane one (1) EDS to one (1) WTMD configurations.

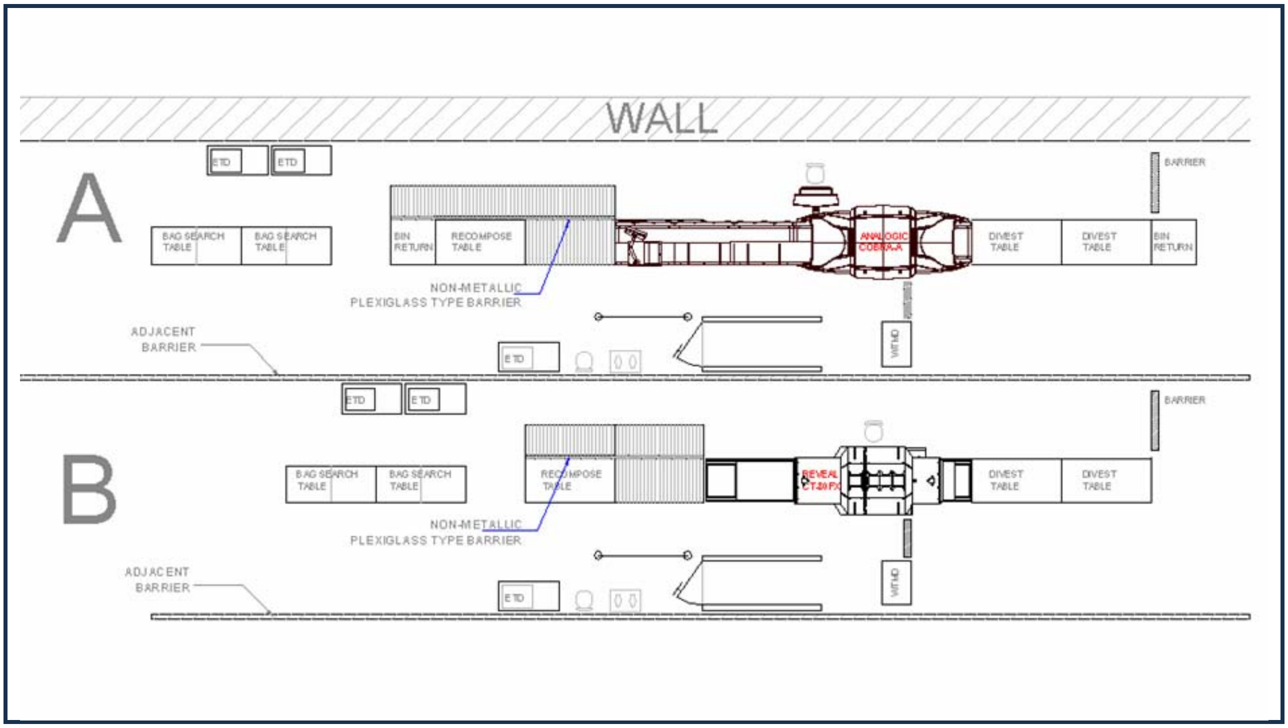
The first layout (**Figure 3-15**) illustrates a notional checkpoint lane configuration with bag search after the recompose tables with wanding station. The configuration shown is a 1-to-1 design with wanding station. This includes a 24" roller conveyor and a non-metallic/Plexiglas barrier behind the recompose tables for separation of clear and alarm items.



<u>LEGEND</u>: A – Analogic Cobra-A, B – Reveal CT-80FX

Figure 3-15. 1-to-1 EDS Design with Wanding Station with Bag Search after Recompose

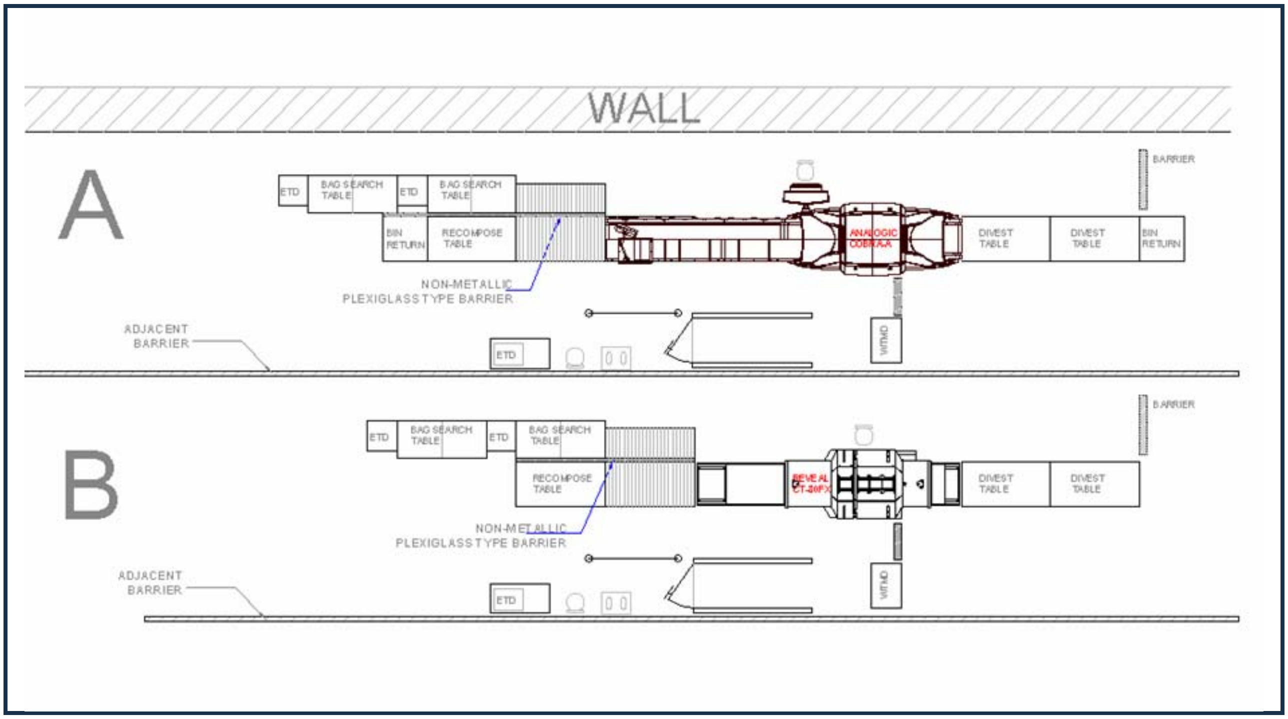
The second layout (**Figure 3-16**) illustrates a notional checkpoint lane configuration with bag search after the recompose tables with holding station. The configuration shown is a 1-to-1 design with wanding station. This includes a 24" roller conveyor and a non-metallic/Plexiglas barrier behind the recompose tables for separation of clear and alarm items.



LEGEND: A – Analogic Cobra-A, B – Reveal CT-80FX

Figure 3-16. 1-to-1 EDS Design with Holding Station with Bag Search after Recompose

The third layout (**Figure 3-17**) illustrates a notional checkpoint lane configuration with Bag search immediate behind the recompose tables with holding station. The configuration shown is a 1-to-1 design with holding station. This includes a 24" roller conveyor and a non-metallic/Plexiglas barrier between the recompose and bag search tables for separation of clear and alarm items.



LEGEND: A – Analogic Cobra-A, B – Reveal CT-80FX

Figure 3-17. 1-to-1 EDS Design with Holding Station with Bag Search behind Recompose

3.3.3 COMBINATION OF DIFFERENT CONFIGURATIONS

Figure 3-18 illustrates a notional checkpoint utilizing a combination of different lane configurations.

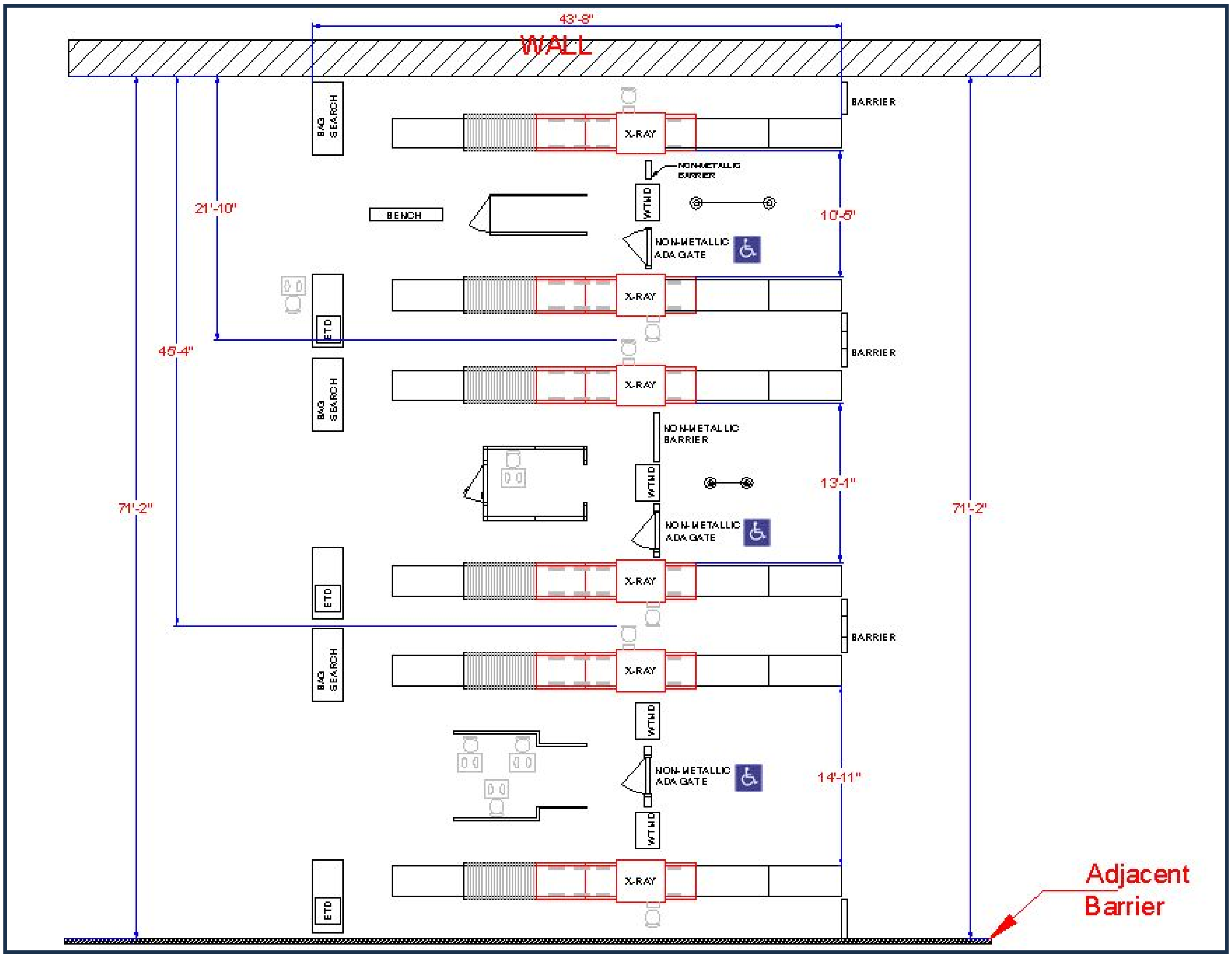


Figure 3-18. 6-Lane Checkpoint Design With Different Configurations Combined

4.0 ELECTRICAL AND IT DATA REQUIREMENTS

4.1 POWER AND IT REQUIREMENTS

Power standards and IT requirements for SSCP approved equipment are summarized in a matrix presented in **Figure 4-1**. The plugs for WTMDs need to be secured using twist-lock receptacles.

Circuits from existing power panels should be used as much as possible. A decision to install any new circuit panels will be determined during the engagement visit, and must be approved by TSA. Airport, state or city requirements will be considered in determining circuit panel needs. Emergency or Uninterruptible Power Source (UPS) backup power is not required at this time for checkpoint areas.

	Equipment	Quantity per Checkpoint or Lane	Power Requirements	Number Data Drops	Data Drop Drawing Label	Termination Equipment End	Termination Patch Panel/IT Rack 110-Punch Down	Data Cable Requirements
1	▪ IT Rack: — 23" W x 36" D x 84" or 59" H ▪ Required Clearance: 36" front, 22" rear — One 36" side may be against wall ▪ Ambient temp: max. 80 deg F.	1 rack per checkpoint at all airports	▪ Dedicated Circuit * ▪ 110-120v/30amp ▪ NEMA L5-30R ▪ (L5-30P comes on the end of the UPS power cord) ▪ (Install circuit through floor or feed via conduit through top)				Terminate all data drops in patch panel for first 10 lanes, over 10 lanes terminate with RJ45 with min 10 feet of extra cable. (Term. X-rays for lane 11 in panel) (Also, allow extra cable for panel terminated lanes 7 10)	▪ All cables to be tested per Cat5E specification, using a PentaScanner tester or equivalent. ▪ Certification reports are required. ▪ Cabling to adhere to TIA/EIA-606-A, Telecommunications Standard. ▪ All jacks/ports and patch panels must be labeled and documentation provided. ▪ (TSA Spec is max. 200' cable pull).
2	Walk Through Metal Detector (WTMD)	1 per lane	▪ Non-dedicated * ▪ Twist-loc outlet 110 ▪ 120v /20a ▪ (operates at 60Hz, <2a, 40-45w) ▪ NEMA L5-15P anti-disconnect plug					
3	Explosives Trace Portal (ETP)	1 per lane	▪ Non-dedicated ▪ Quad outlet ▪ 110-120v /20a	2	D	568B jacks on flush plate - cover unused ports	Terminate lanes 1-11 in panel, RJ-45 plug on cables for >11 lanes.	▪ Cat5e-350 ▪ (Belkin A7L604 or equivalent) ▪ Max. 200 foot cable run.
4	X-ray	1 per lane	▪ Non-dedicated * ▪ Quad outlet ▪ 110-120v /20a	2	D	568B jacks on flush plate - cover unused ports	Terminate lanes 1-11 in panel, RJ-45 plug on cables for >11 lanes.	▪ Cat5e-350 ▪ (Belkin A7L604 or equivalent) ▪ Max. 200 foot cable run.
5	Explosive Trace Detection (ETD)	1 per 2 lanes	▪ Non-dedicated * ▪ Quad outlet ▪ 110-120v /20a	2	D	568B jacks on flush plate - cover unused ports	Terminate lanes 1-10 in panel, RJ-45 plug on cables for >10 lanes.	▪ Cat5e-350 ▪ (Belkin A7L604 or equivalent) ▪ Max. 200 foot cable run.

Figure 4-1. IT Power and Data Drop Requirements (1 of 2)

	Equipment	Quantity per Checkpoint or Lane	Power Requirements	Number Data Drops	Data Drop Drawing Label	Termination Equipment End	Termination Patch Panel/IT Rack 110-Punch Down	Data Cable Requirements
6	▪ Wireless Access Point (WAP) ▪ Min. 8' AFF ▪ A/C and data jack within 10" ▪ Positioned with line-of-sight to checkpoint & queuing areas	1 per checkpoint	▪ Non-dedicated * ▪ Duplex outlet ▪ 110-120v /20a	1	W	568B jack on flush mounted plate	Terminate cable in patch panel.	▪ Cat5e-350 ▪ (Belkin A7L604 or equivalent) ▪ Max. 200 foot cable run.
7	▪ Electronic Time Clock ▪ Mount 48" from floor ▪ Convenient for TSO use ▪ Data & power boxes 3.5" cntr-to-cntr ▪ Power box on left, data box on right ▪ Data box open w/min.12"cable w/plug ▪ 1.5A max. power consumption	1 per 2 lanes, rounded up for odd numbers	▪ Non-dedicated * ▪ Duplex outlet ▪ 110-120v /20a	1	K	Data cable terminated with 568B plug (male) with 12" excess cable in single gang box to right of power box	Terminate lanes 1-10 in panel, RJ-45 plug on cables for >10 lanes.	▪ Cat5e-350 ▪ (Belkin A7L604 or equivalent) ▪ Max. 200 foot cable run.
8	▪ LEO Station ▪ (If LEO does not have a dedicated podium, locate in suitable location)	1 per checkpoint	▪ Non-dedicated * ▪ Duplex outlet ▪ 110-120v /20a	2	D	568B jacks on flush plate - cover unused ports	Terminate cables in patch panel.	▪ Cat5e-350 ▪ (Belkin A7L604 or equivalent) ▪ Max. 200 foot cable run.
9	STSO Station (Cat. X & 1 only)	1 per Cat X & 1 checkpoints	▪ Non-dedicated * ▪ Duplex outlet ▪ 110-120v /20a	2	D	568B jacks on flush plate - cover unused ports	Terminate cables in patch panel if there is a STSO podium.	▪ Cat5e-350 ▪ (Belkin A7L604 or equivalent) ▪ Max. 200 foot cable run.

* Power Clarification Notes:
1. Nothing can be branched off of a WTMD/EMD's circuit, i.e. all WTMD/EMDs should share one dedicated circuit
2. WTMD/EMDs should be on same phase as X-ray
3. The IT cabinet must be installed on a dedicated 30A circuit
4. As long as wiring is within code for circuit capacity, can branch off an X-ray or ETD for devices such as WAPs, modems, time clocks, etc; there is no operational interference
5. Emergency power/UPS is NOT required

Figure 4-1. IT Power and Data Drop Requirements (2 of 2)

4.2 POWER AND DATA RECEPTACLES

Power and data receptacles should be of high quality and suitable for the industrial application at a high throughput airport checkpoint. Some receptacle options with comments are listed in **Figure 4-2**. Other suitable manufacturer's devices can also be considered. The use of any power and data boxes, fittings, or plates (other than standard 2x4 or 4x4 wall boxes with standard 2x4 or 4x4 plates) need to be coordinated with Airport Authority. All power installations must meet local codes.

Style	Vendor	Part Number	Features	Installation	Comment
Floor Flush Poke-through	Walker Wiremold	RC7ATCxx xx = color	Two Cat. 5e jacks, Duplex a/c 5-20R	3" cored hole	Advantage: Integrated slide covers
Floor Flush Poke-through	Walker Wiremold	RC4ATCxx xx = color	Two Cat. 5e jacks, Quad a/c 5-20R	4" cored hole	Advantage: Integrated slide covers
Floor Pedestal One Service Poke-through	Walker Wiremold	FIT with 200 series head	Four Cat5e jacks or Quad a/c	2" cored hole	Single service – power or data, Single width, housing may not be durable
Floor Pedestal One Service Poke-through	Walker Wiremold	FIT with 241 series head	Eight Cat5e jacks or two Quad a/c	2" cored hole	Single service – power or data, Double width, housing may not be durable
Floor Pedestal Multiservice Poke-through	Walker Wiremold	RC91GHBTC	Two Cat. 5e jacks, Duplex a/c	3" cored hole	Multiservice – power and data, single width, housing may not be durable
Floor Pedestal Multiservice Poke-through	Walker Wiremold	RC92GHBTC	Four Cat. 5e jacks, Quad a/c	3" cored hole	Multiservice – power and data, double width, housing may not be durable
"Tombstone" style surface mount	Walker Wiremold	505 (separate pieces or 500E Series (one piece)	Duplex a/c or up to 4 Cat5e jacks	¾" conduit feed hole	Intended to be activated through Walkerduct underfloor duct or raceway. Some electricians bolt to floor and feed via conduit.
Floor Flush Poke-through	Hubbell	PT7FxxSLA xx = color	Two Cat. 5e jacks, Duplex a/c 5-20R	3" cored hole	Disadvantage: Data jacks protrude and are too easily removed allowing dirt in data jack, A/C lift up covers break off.
Floor Flush Poke-through	Hubbell	PT4Xxx2CC xx = color	Four Cat. 5 jacks, Four a/c 15 amp	3" cored hole	Cat 5 only versus Cat5e, 15amp power outlets versus 20amp
Floor Flush Poke-through	Hubbell	PT2X2xxS3 xx = color	Two Cat. 5e jacks, Duplex a/c 20 amp	3" cored hole	Cat 5 only versus Cat5e, 15amp power outlets versus 20amp
"Tombstone" style surface mount	Hubbell	PT7P2TA	Duplex 20a a/c and one data plate	3" cored hole	
Floor Pedestal Poke-through	Hubbell	SA6685/86 SA6687/88	Two Gang and Four Gang Pedestal Housing	¾" and 1" hub	Standard housing, small floor hole

Figure 4-2. Power and Data Receptacle Options

In addition, the Airport Authority should be consulted for style preference, such as flush mount poke-through devices or “tombstone” surface mount boxes. Consideration should also be given to a suitable color – such as gray, black, and brass. Since floor receptacles require core drilling or floor trenching, the airport should be advised of options and the size of the core drilled holes. Poke-through devices generally require a 3” or 4” core drilled hole. Surface mount “tombstone” may only require a ¾” hole to run conduit through the hole.

A sufficient amount of electrical receptacles must be provided to power equipment. The use of extension cords for permanently installed equipment is not authorized. Power cords will be secured and not placed across walking-working surfaces or run underneath anti-fatigue mats such that they may cause a trip hazard or become damaged from traffic. Care must also be taken to ensure that electrical plugs are protected from damage or inadvertent contact by equipment and personnel.

All data jacks should be flush mounted with the receptacle housing and there should be no loose wires extending from the receptacle housing.

In order of preference, TSA prefers equipment be powered through:

- Floor and wall monuments (non-surface mounted), such as “tombstone” style
- Floor and wall monuments (surface mounted)
- Power poles – used as last resort

4.3 POWER PLACEMENT GUIDELINES

TSA checkpoint electric location guidelines are shown in **Figure 4-3**. All receptacles should be positioned under equipment to avoid tripping hazards for both the passengers and Transportation Security Officer (TSO).

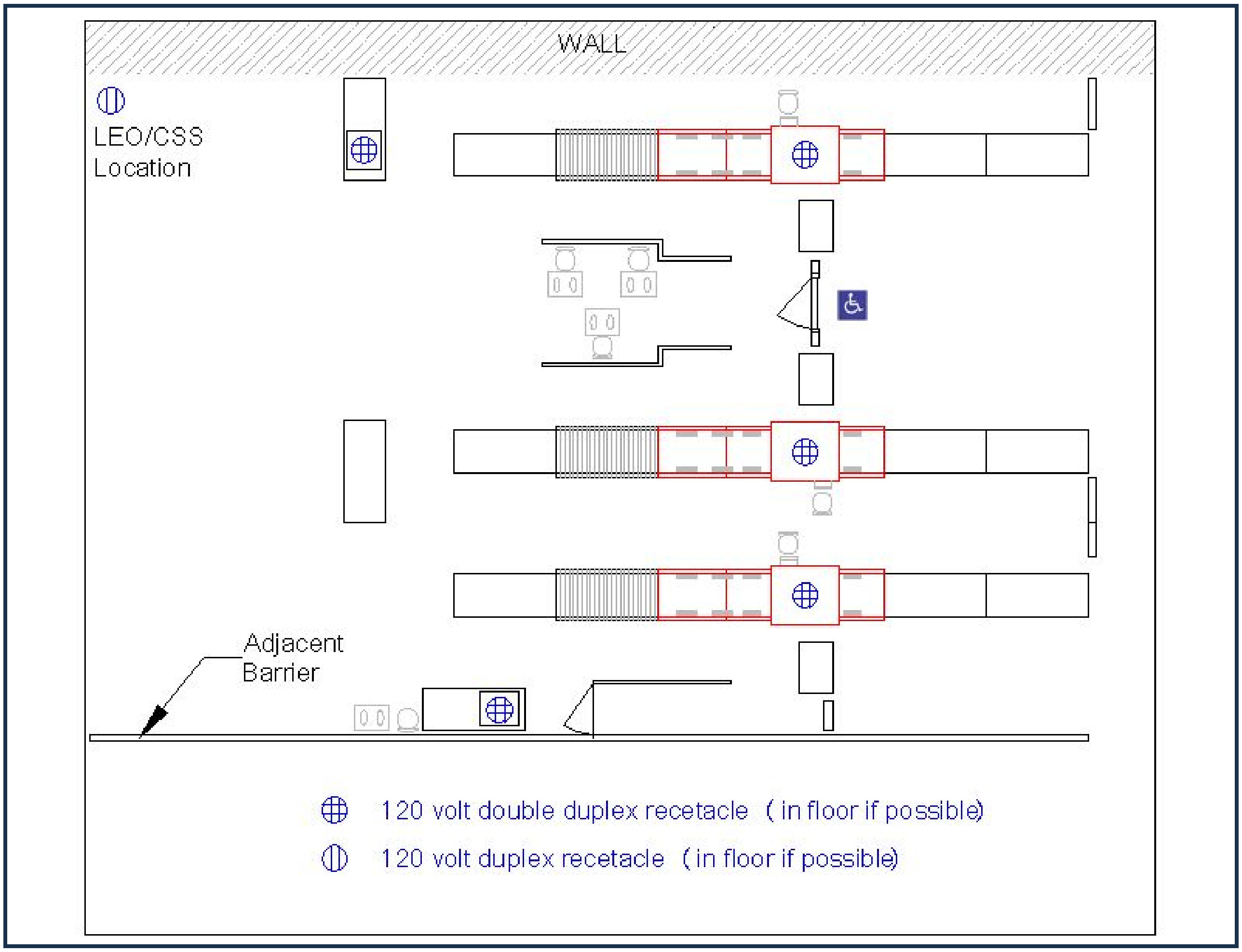


Figure 4-3. Checkpoint Electrical Placement Guidelines

5.0 SAFETY

5.1 SAFETY PARTICIPATION IN SSCP DESIGN

SSCP's need not only to screen passengers and their carry-on baggage, but to do so without compromising the safety either of the passengers or of the TSO's conducting the screening. It is much easier to ensure this if safety is built into the SSCP design from the beginning. Thus, whenever possible, safety-related considerations regarding SSCP design should not be treated separately, but should be considered as an integral part of the design process. The standard checkpoint layouts in this document are intended to provide good starting points for this process, but it is still important to have a safety subject matter expert available at every phase of the design to provide review and input.

Particular safety issues that are likely to arise in the course of SSCP design are discussed elsewhere in this document, in the appropriate section on the equipment or layout aspect involved. However, this document is not intended to provide an exhaustive list of such issues. The safety subject matter expert should review all available sources of information, such as best practices, TechNotes, OSHE directives, and TSO injury data and data analysis, to ensure that the most up to date knowledge is incorporated into each SSCP design.

It is also important to ensure that the ASHRAE standards for Thermal and Ventilation are met within the SSCP and its equipment. Indoor air temperature and relative humidity levels should be maintained within manufacturer required specifications, and dilution ventilation in the checkpoint to prevent the build-up of carbon dioxide from human respiration and to control odors. As checkpoints are designed and reconfigured, the Airport Authority may need to re-balance the airport HVAC or review their HVAC preventative maintenance procedures accordingly.

6.0 APPENDIX A – GLOSSARY

ADA	Americans with Disabilities Act
Cat5/Cat6	Category 5 cable, Category 6 cable
CCTV	Closed Circuit TeleVision
CTO	Chief Technology Office
EDS	Explosives Detection System
EMD	Enhanced Metal Detectors
ETD	Explosives Trace Detection
ETP	Explosives Trace Portal
fc	Foot-candles, unit of illuminance or light intensity
FSD	Federal Security Director
HHMD	Hand Held Metal Detector
Hi-SOC	High Speed Operational Connectivity
HVAC	Heating, Ventilation and Air Conditioning
IT	Information Technology
LAN	Local Area Network
LEO	Law Enforcement Officer
NEMA	National Electrical Manufacturers Association
NQR	Nuclear Quadropole Resonance
O&D	Origin and Destination
OEM	Original Equipment Manufacturer
OSHA	Occupation Safety & Health Administration
PC	Personal Computer
POC	Point of Contact
SF	Square Footage
SSCP	Security Screening Checkpoint
STSO	Supervisory Transportation Security Officer (Station or Podium)
TIP	Threat Image Projection
TRX	TIP-Ready X-ray
TSA	Transportation Security Administration
TSO	Transportation Security Officer
UPS	Uninterruptible Power Supply
WAP	Wireless Access Point
WTMD	Walk Through Metal Detector

7.0 APPENDIX B – CHECKPOINT EQUIPMENT REQUEST FORM

Transportation Security Administration

Use this form to Request TSA-HQ approval and/or support for:
1. Checkpoint Lane Expansion Equipment
2. Checkpoint/Lane Equipment Relocation or Reconfiguration
3. Checkpoint Equipment Decommission

Blue fields indicate pick-lists.
Please email this completed form to ScreeningSupportRequest@dhs.gov.

Checkpoint Equipment Request

Issue ID # ______
for HQ use only

Date ______
date form completed by Airport

Request Type

Request Type

Request Type

Request Type

Month Needed ______ **Year Needed** ______

Airport Information

Airport Name ______
FSD Name ______ (First Name) ______ (Last Name)
FSD Email Address ______
FSD Phone Number ______
Point of Contact Name ______ (First Name) ______ (Last Name)
POC Email Address ______
POC Phone Number ______
Industrial Engineer of Contact Name ______ (First Name) ______ (Last Name)
IE Email Address ______
IE Phone Number ______

Area ______
Airport Code ______
Airport Category ______
Area Director Concur ______

SAMPLE

If your request is for:
- Checkpoint Lane Expansion Equipment proceed to **SECTION A**; or,
- Checkpoint Equipment Decommissioning, proceed to **SECTION B**; or,
- Checkpoint/Lane Equipment Relocation or Reconfiguration proceed to **SECTION C**.

Form_Checkpoint Equipment Request Field.xls
Equipment Requests 10/27/2006 1 of 5

Figure 7-1. Checkpoint Equipment Request Form (page 1)

SECTION A: New Equipment

Type of Installation Requested

Type of Installation Requested

IT Systems Required

IT Systems Required

Are additional lanes requested?

If yes, how many?

Machine Type Requested	Quantity	Installation Location in Airport

Request Description

Description should include *Airport construction information; new carriers; carriers moving terminals; Send attachments containing: proposed illustrations of changes, checkpoint layout (CAD or PDF file with dimensions clearly stated) to evaluate the layout. etc.; Activity type and level changes (e.g., decrease or increase in traffic type)*

Is there a need to modify Walls, Ticket Counters, Flooring, Ceiling etc.?

Is HVAC (heating/cooling) required?

Is power available? What is the voltage? Lighting?

Are Data/communication lines currently in place?

Will the new equipment replace old equipment?

If yes, continue to ***SECTION B****. If no, proceed to* ***SECTION C****.*

Form_Checkpoint Equipment Request Field.xls
Equipment Requests

10/27/2006

2 of 5

Figure 7-2. Checkpoint Equipment Request Form (page 2)

SECTION B: Decommissioning Equipment

Machines to be removed	Serial Number	Government Property Tag Numbers	Removal Date	Current Location	Is Machine Operational?

Is any demolition required to remove equipment?	
Are there any condensate lines attached to equipment?	
Is the equipment currently connected to power?	

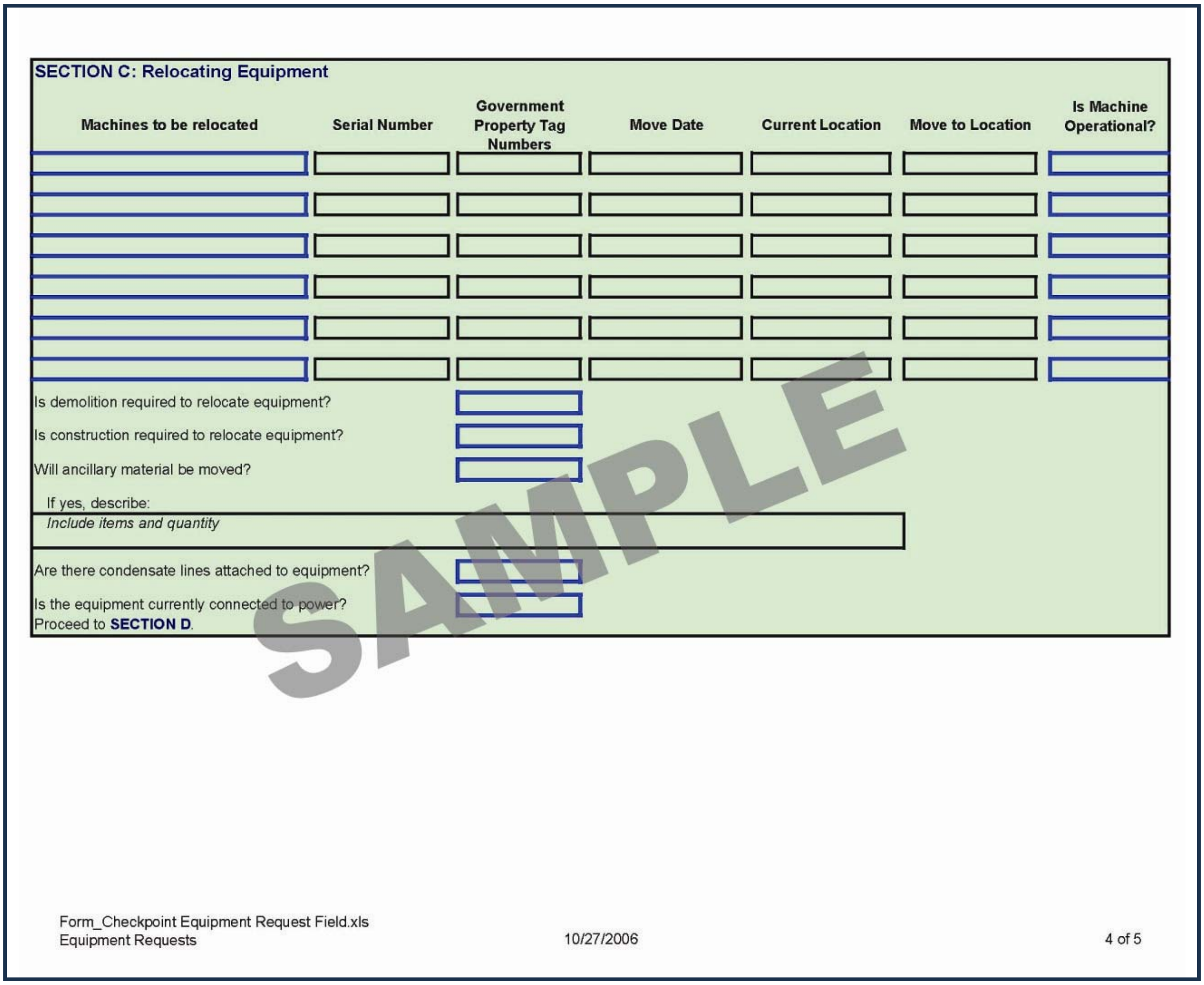
Proceed to **SECTION D**.

Form_Checkpoint Equipment Request Field.xls
Equipment Requests

10/27/2006

3 of 5

Figure 7-3. Checkpoint Equipment Request Form (page 3)



SECTION C: Relocating Equipment

Machines to be relocated	Serial Number	Government Property Tag Numbers	Move Date	Current Location	Move to Location	Is Machine Operational?

Is demolition required to relocate equipment?

Is construction required to relocate equipment?

Will ancillary material be moved?

If yes, describe:

Include items and quantity

Are there condensate lines attached to equipment?

Is the equipment currently connected to power?

Proceed to **SECTION D**.

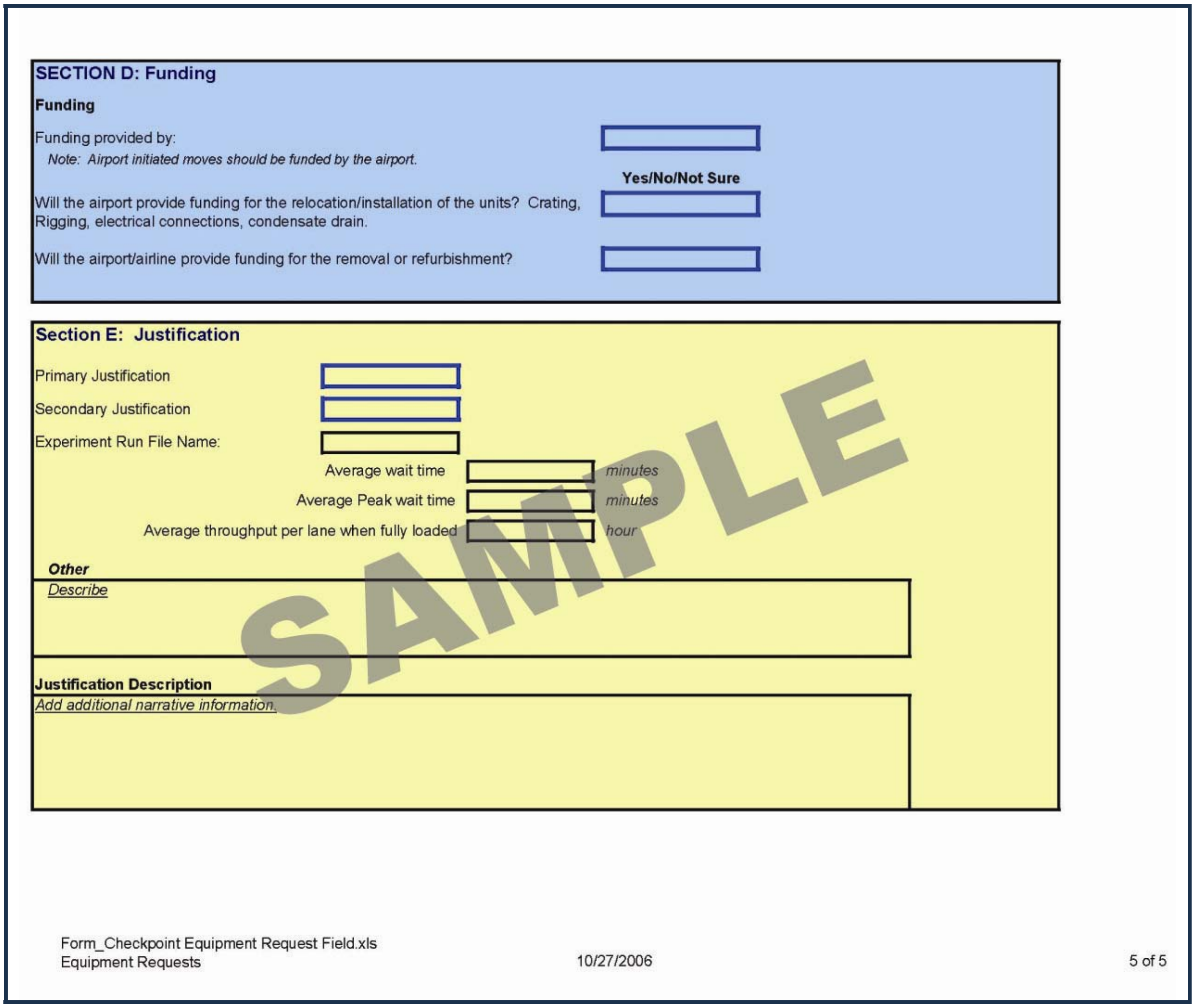
SAMPLE

Form_Checkpoint Equipment Request Field.xls
Equipment Requests

10/27/2006

4 of 5

Figure 7-4. Checkpoint Equipment Request Form (page 4)



SECTION D: Funding

Funding

Funding provided by:

Note: Airport initiated moves should be funded by the airport.

Yes/No/Not Sure

Will the airport provide funding for the relocation/installation of the units? Crating, Rigging, electrical connections, condensate drain.

Will the airport/airline provide funding for the removal or refurbishment?

Section E: Justification

Primary Justification

Secondary Justification

Experiment Run File Name:

Average wait time *minutes*

Average Peak wait time *minutes*

Average throughput per lane when fully loaded *hour*

Other

Describe

Justification Description

Add additional narrative information.

SAMPLE

Form_Checkpoint Equipment Request Field.xls
Equipment Requests

10/27/2006

5 of 5

Figure 7-5. Checkpoint Equipment Request Form (page 5)