

COMPREHENSIVE BEST PRACTICES FOR IMPLEMENTING SECURITY SYSTEMS

Public Transportation Vol. 1





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What Is Good-Better-Best (G-B-B)?

Whether you are a facility manager, risk management professional or safety officer or have more of a "traditional" title of security program manager, points of reference are an absolute must when investing capital in electronic security and safety solutions. The question remains, "What is the reference criteria needed to make an informed decision on the most appropriate fit of an offer of products and services for my facility?"

The fact that you've taken the time to research how to make an informed decision is a significant leap in the right direction away from "lowest qualified price" criteria. Now, this doesn't mean understanding pricing strategy is any less important to measuring the improvement to a "better" or "best" level from a minimum needs level that we'll refer to as "good" in this document.

Regardless of what offering is made and what criteria were used in developing that design, all choices need to reflect how the security dealer or systems integrator works together with the end user as a trusted advisor or business partner.



- The offering meets minimum compliance requirements
- Security supports deterrence detection and response for most common threats
- Most systems are standalone



- The offering includes a wider range of and or/ more accurate sensors
- Product selection is customized to match a specific operation
- The offering includes basic systems integration



- There is a measurable return on investment through technology
 enhancements
- The offering includes advanced systems integration –all systems can share data sets, enabling system-wide analytics







Good-Better-Best for Transportation Security

Public transportation systems provide large volumes of people with reliable access to affordable passage. They are designed to reduce friction, allowing passengers to enter and exit the systems seamlessly and on demand. This volume of people and ease of access, combined with the confined spaces and location of these systems in massive city centers, makes public transportation susceptible to adversarial targeting and



threats. Terrorism is indeed the worst-case scenario, but in systems like these, the day-to-day security and safety concerns, such as crime or accidents, are the ones that keep security teams busy. With so many vehicles and passengers in motion on a given day, accidents and incidents occur numerous times per day, and coordination with law enforcement is key when an emergency arises.

For the second in a series of G-B-B use cases, the Security Industry Association (SIA) focused on public transportation, specifically a multi-modal urban transportation hub. SIA collaborated with industry professionals to outline Good-Better-Best security cases. SIA's Public Safety Interest Group, which brings together various stakeholders in the public safety ecosystem – including practitioners, integrators and manufacturers – then reviewed the guidance. Transportation is a broad topic, and future volumes of this Good-Better-Best transportation series will focus on other public transportation modalities.

According to guidance issued by the Federal Transit Administration, public transportation agencies should be moving from governance focused on compliance to a more proactive data driven program based on the principles of safety management systems (SMS), which help organizations improve upon their safety performance by supporting the institutionalization of beliefs, practices and procedures for identifying, mitigating and monitoring safety risks. SMS





activities proactively detect safety concerns and organizational factors and correct them using data-driven prioritization. As such, important to SMS success are the:

1. Effective collection, analysis and sharing of safety data

2. Active, accurate and routine safety performance measurement

The Good-Better-Best approach matches this approach; as a system moves from good to best, the amount of data distribution and collection between systems increases. For example, sharing of data from security and safety systems with other transportation operational teams can help identify risks such as litter on the tracks, which can lead to fires, corroded or otherwise damaged rails or a person falling onto the tracks.

The guidance in this G-B-B document considers security features to help mitigate the risk or aid in the response or resolution of incidents such as, but not limited to:

Accidents

- Collisions
- Crash damages to vehicle occupants
- Crash damages to bystanders (e.g., pedestrians, cyclists, occupants of other vehicles)
- Falls

Crimes

- Terrorist attacks
- Vandalism
- Sabotage
- Unauthorized access (e.g., unpaid access to systems or non-passenger areas)
- Theft
- Trespassing

Other

- Suicides and suicide attempts
- Coordination with law enforcement on crimes outside of the system
- Egress monitoring





G-B-B System Design Methods

There are numerous types of devices used in each of the typical electronic security system (ESS) categories used in G-B-B; the types of security and safety systems are listed in this graphic.



Total ESS









Physical Access Control System, Card readers, keypads, biometric capture devices, doors or opening locking system, egress devices, lock, door, PACS panel device status sensors

Communication System intercoms, VOIP devices, mobile devices

Fire and Life Safety System

Smoke and flame detection sensors, manual fire signaling devices, audio/visual alert devices,control of egress path part of PACS, control of HVAC return air, monitoring of deluge system, transmission to central station

Video Surveillance System

Cameras producing DMC (video, audio, metadata), analytic applications embedded in camera

Perimeter/Intrusion Detection System

Perimeter door, fence, gate, barrier status sensors (not included in PACS), LiDar, radar space protection or tethered autonomous UAV, ground-based UGV or UUV in body of water mobile area protection

Network and Telecommunications Infrastructure

Network and telecommunications physical and logical transmission and storage infrastructure, including wired and wireless systems

Security Information and Event Management

Manages cybersecurity, data storage, cloud providers, network hardware supporting ESS, SIEM including functions of PSIM and device alert functions of VSS, PACS, COMM, ICT, PER





Transportation High-Priority Systems

Given that fire, voice evacuation, signaling, life safety systems, power distribution, backup power for critical systems and fare collection equipment are the highest priority in any type of transportation hub setting and require specialized installation, we are not covering those within the scope of this document's guidelines and best practices.

Design Leveraging IoT trends

According to Forbes, there were 8.4 billion connected devices in 2017, expected to more than double by 2020. This prediction proved to be greatly underestimated, as the smart device trends for 2019 report the number of Internet of Things (IoT) devices expected to quintuple to 125 billion by 2030. The trend of "everything connected" has led to wide-ranging estimates on the current state to the increase in network-connected devices. Many of these are in both the industrial security and consumer electronics industries, and the effect of consolidating platforms to support this growth leads us to a design approach in G-B-B.

The four biggest issues facing IoT technology and the evolution of many classes electronic security devices are:

1. Power management

- 2. Connectivity
- 3. Hardware performance and compatibility

4. Platform integration, especially with cybersecurity, policies and upgrades

With these requirements comes a focus on specifying the best sensor/device for a given location and providing cross-system compatibility and integration by sharing a common platform wherever possible. As stated in the graphic about ICT, when network infrastructure is equipped with IEEE 802.3af and IEEE 802.3bt Power over Ethernet ports to power the security devices and panels, reliability is significantly improved as the power sources are monitored, managed and backed up.





Using the G-B-B Project Detail

The detailed spreadsheet of ESS equipment and function is organized the same way one would perform a site survey: by location, as shown in this figure.

This method puts the sensors and devices that provide situational awareness as a high priority and allows the designer to select a consolidated platform to reduce software licensing costs and reduce operator training time. What if there is no single platform to support all these devices? This is the best point in the project design to discover which ESS system is already budgeted in the SEIM and ICT platforms through joint efforts with an enterprise IT department. If system support is unavailable for a given specialized security device or integration would be at an unreasonable expense, that device should be included in the project as a recommendation and included on the security integration and IT road map.

There are many other approaches to designing the total ESS, including the following:

- Build out each system by G-B-B tier, then perform value engineering to avoid duplication or over-complication.
- Specify integrated software platform first, then separate ESS individual systems that do not fully integrate.







Overall, there are two main types of risks in the design approaches. There is risk of specifying devices separately and, by extension, multiple platforms to manage security data that could be processed more effectively in a single virtual or cloud environment capable of scaling on demand. Additionally, there is the risk of specifying the platforms first and missing out on "best of class" sensors that are better suited to an environment.

Transportation Facility Safety Systems

Mass Notification Systems

The latest notification systems include network-wide alert mechanisms that provide real-time, system-wide information and updates on emergency conditions. These systems include signage for on-premises customers or may be linked to mobile applications.

Transportation Facility Security

Security and life safety measures are essential in any transportation facility. Sensors, both physical and IoT/video technology-based, offer notifications to operations and security personnel to deploy response. Emergency beacons, strategically placed in these locations, provide additional points for communications for faster response times.



G-B-B Project Value Detail

In the G-B-B project value detail (spreadsheet), location symbols used are as follows:

Numbered symbols indicate physical locations:
 ① ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑪ ① ⑫ ③ ④ ⑤ ⑦ ⑧ ⑨ ⑳

The following are the G-B-B equipment details for each location, with a summary differentiating good, better and best versions.

1 Main Station Entrance

Main thoroughfare which may include turnstiles, automated fare vending kiosks, station managers booth, and entrance to retail/convenience kiosks. Leads to access to all platforms and waiting areas.

- Outdoor cameras' quantity and placement are 60 pixels per foot (ppf) (Good), 80ppf (Better), 120ppf (Best) allowing facial recognition (FR) as Best, for public safety personnel within a security operations center
- Audio and video intercoms always voice over Internet Protocol (VoIP) compatible; video intercom is video over IP compatible (desktop VoIP station) and mobile computing device compatible

Location	System	Description	Good	Better	Best
Main Station Entrance	VSS	Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Station Surveillance, Qty to Be Adjusted, Depending on Coverage	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Object Detection, Plus "Better" Features
	ІСТ	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	PACS	Card Reader (EA Entry)	Card Reader (EA Entry)	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP
	PACS	Door Status Monitoring	Door Status Contacts (External)	Door Status Contacts Plus Electric Lock Status Monitoring (Built into Lock)	Local Audio/Visual Alarm + "Better" Features
	PACS	Entry and Egress Devices for Sliding Doors	Exit Motion Sensor Plus Egress Hardware	Egress Hardware W/ Connection to PACS Panel Rex Port	Built-In Locking System, Door Status, Lock Status Plus "Better" Feature
	PACS	Automatic Sliding Doors Power Source	External Unmanaged Power Supply + Connection to Fire Alarm and Life Safety System	Includes Battery Backup + "Good" Features	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	ІСТ	PACS Panel Power Source	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	PACS	Lockdown (Active Assailant), Door Release Controls (Workplace Violence)	Not Required	Connection to Lockdown/Release Controls (Requires Bond Sensor) Done With Electrified Lockset)	Interface to VOIP System + "Better" Features
	PACS	Outdoor Audio Intercom With VOIP	With Audio to VOIP Stations and Mobile Devices	With Integrated Card Reader + "Good" Features	With Integrated Card Reader + "Good" Features
	PACS	Entry/Exit Outdoor Video Intercom With VOIP	Not Required	Not Required	Integrated Video Sensor Has Facial Recognition
	Perimeter	Acoustic Gunshot, Vandalism and Vehicle Crash Sensor	Not Required	Automatic VOIP Messaging	Automatic VOIP Messaging





- Door status contacts are built into locking systems or sliding door systems for Better and Best
- The physical access control system (PACS) has lockdown and full door release controls (Better, Best)
- PACS lockdown and full door release controls (Best)
- All virtual security system (VSS) camera and PACS panel power provided by network switches with PoE (Better); lock power provided by PoE++ (Best)

2 Transit Vehicle Entry

Main gate for transportation vehicles (buses) to enter the complex from the street.

- Outdoor IP camera which has license plate capture and recognition of arriving vehicles
- Vehicle presence sensors

Location	System	Description	Good	Better	Best
2 Transit Vehicle Entry	VSS	Qty (2) Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry Recording and Outdoor Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	VSS	Outdoor Fixed Camera With LPR Analytics Software Detects Vehicle Arrival	Not Required	Not Required	Camera Captures Vehicle Arrivals for Entry and Alert Via License Plate
	ICT	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	Parking	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)

3 Transit Vehicle Exit

Main gate for transportation vehicles (buses) to exit the complex to the street.

- Similar levels as ② TRANSIT VEHICLE ENTRY
- Outdoor camera has license plate capture and recognition of arriving vehicles (Best)

Location	System	Description	Good	Better	Best
3 Transit Vehicle Exit	VSS	Qty (2) Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry Recording and Outdoor Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	VSS	Outdoor Fixed Camera With LPR Analytics Software Detects Vehicle Arrival	Not Required	Not Required	Camera Capture Vehicle Arrivals for Entry and Alert Via License Plate
	ІСТ	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	Parking	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)



4 Customer Parking

Short Term Parking lot for customers.

- Intercom for two-way communication to provide access exceptions
- Assistance beacons (Best)
- Vehicle presence sensors, for ease in parking space location finding •

Location	System	Description	Good	Better	Best
Customer Parking	VSS	Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Parking Area Surveillance, Qty to Be Adjusted, Depending on Coverage	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Object Detection, Plus "Better" Features
	ІСТ	Connection to PoE Port(s) for Above at ICT EQ Closet	Via Port on PoE Network Switch	Via Port on PoE Network Switch	Via Port on PoE Network Switch
	PACS	Outdoor Video Intercom With VOIP	Not Required	Not Required	Integrated Video Sensor Has Facial Recognition
	Comm	Outdoor Emergency Call Audio Station	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP
	ІСТ	Connection to PoE Port(s) for Above at ICT EQ Closet	Via Port on PoE Network Switch	Via Port on PoE Network Switch	Via Port on PoE Network Switch
	Perimeter	Acoustic Gunshot, Vandalism and Vehicle Crash Sensor	Not Required	Automatic VOIP Messaging	Automatic VOIP Messaging
	Parking	Lorawan Parking Sensor for Parking Capacity	Not Required	Not Required	Lorawan Parking Sensor for Parking Capacity
	Parking	Toxic Gas Detection Control Panel With Remote Sensor/Audio/Visual Devices	Not Required	Not Required	Toxic Gas Detection Control Panel

GOOD BETTE

BEST

R





5 Bus Bay Parking

Parking area for buses that are accepting or discharging passengers or are temporarily out of service.

• Pedestrian access has egress hardware with built-in door status and request to exit contacts

Location	System	Description	Good	Better	Best
5 Bus Parking Bay	VSS	Qty (2) Indoor Fixed Dome Network Camera HDTV 1080p,Outdoor Fixed Dome Network Camera HDTV 1080p, POE for Entry Recording and Bus Bay Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	ІСТ	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	PACS	Card Reader (EA Entry)	Card Reader (EA Entry)	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP
	PACS	Door Status Monitoring	Door Status Contacts (External)	Door Status Contacts Plus Electric Lock Status Monitoring (Built into Lock)	Local Audio/Visual Alarm + "Better" Features
	PACS	Entry and Egress Devices for Sliding Doors	Exit Motion Sensor Plus Egress Hardware	Egress Hardware W/ Connection to PACS Panel Rex Port	Built-In Locking System, Door Status, Lock Status Plus "Better" Feature
	PACS	Automatic Sliding Doors Power Source	External Unmanaged Power Supply + Connection to Fire Alarm and Life Safety System	Includes Battery Backup + "Good" Features	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	ІСТ	PACS Panel Power Source	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	PACS	Lockdown (Active Assailant), Door Release Controls (Workplace Violence)	Not Required	Connection to Lockdown/Release Controls (Requires Bond Sensor) Done With Electrified Lockset)	Interface to VOIP System + "Better" Features
	PACS	Outdoor Audio Intercom With VOIP	With Audio to VOIP Stations and Mobile Devices	With Integrated Card Reader + "Good" Features	With Integrated Card Reader + "Good" Features
	PACS	Entry/Exit Outdoor Video Intercom With VOIP	Not Required	Integrated Audio Sensor; Emergency Call	Integrated Video Sensor Has Facial Recognition; Emergency Call
	Parking	Toxic Gas Detection Control Panel With Remote Sensor/Audio/Visual Devices	Not Required	Not Required	Toxic Gas Detection Control Panel



Passenger waiting area for buses.

- Similar levels as 1 MAIN STATION ENTRY but with indoor cameras
- Single door has egress hardware with built-in door status and request to exit (REX) contacts (Best)

Location	System	Description	Good	Better	Best
6 Bus Stop Waiting Area	VSS	Qty (2) Indoor Fixed Dome Network Camera HDTV 1080p, PoE for Bus Waiting Area Recording	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Plus Qty (2) Additional Facial Recognition Entry Recording Licenses, Plus "Better" Features
	ІСТ	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	PACS	Video Intercom With VOIP	With Audio/Video Streaming to VOIP Stations and Mobile Devices	With Integrated Card Reader + "Good" Features	With Facial Recognition + "Better" Features
	PACS	Card Reader (EA Entry)	Card Reader (EA Entry)	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP
	PACS	Door Status Monitoring	Door Status Contacts (External)	Door Status Contacts Plus Electric Lock Status Monitoring (Built into Lock)	Local Audio/Visual Alarm + "Better" Features
	PACS	Entry and Egress Devices for Sliding Doors	Exit Motion Sensor Plus Egress Hardware	Egress Hardware W/ Connection to PACS Panel Rex Port	Built-In Locking System, Door Status, Lock Status Plus "Better" Feature
	PACS	Automatic Sliding Doors Power Source	External Unmanaged Power Supply + Connection to Fire Alarm and Life Safety System	Includes Battery Backup + "Good" Features	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	ІСТ	PACS Panel Power Source	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	PACS	Lockdown (Active Assailant), Door Release Controls (Workplace Violence)	Not Required	Connection to Lockdown/Release Controls	Interface to VOIP System + "Better" Features
	PACS	Entry/Exit Outdoor Video Intercom With VOIP	Not Required	Integrated Audio Sensor; Emergency Call	Integrated Video Sensor Has Facial Recognition; Emergency Call
	Parking	Toxic Gas Detection Control Panel With Remote Sensor/Audio/Visual Devices	Not Required	Not Required	Toxic Gas Detection Control Panel



7 Other Station Entry/Exit

Alternate station entry/exit, typically designed for lower throughput with a smaller number of turnstiles, and only automated fare vending.

 Single door has egress hardware with built-in door status and request to exit (REX) contacts (Best)

Location	System	Description	Good	Better	Best
Other Station Entry/Exit	VSS	Qty (2) Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry Recording and Outdoor Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	VSS	Qty (2) Indoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry/ Exit Recording and Surveillance Of Full Height Turnstiles	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	PACS	Outdoor Emergency Call Audio Station Entry/Exit Outdoor Audio Intercom With VOIP	Emergency Call or Duress Code Available	Emergency Call or Duress Code Available Integrated Audio Sensor; Emergency Call	Integrated Video Sensor Has Facial Recognition; Emergency Call
	ICT	Connection to PoE Port(s) for Above at ICT EQ Closet	Via Port on PoE Network Switch	Via Port on PoE Network Switch	Via Port on PoE Network Switch

8 Elevated Rail Tracks & Platform

Oudoor waiting area and exit area for rail passengers. May contain seating areas and outdoor shelters for inclement weather.

- Outdoor cameras' quantity and placement is 60ppf (Good), 80ppf (Better), 120ppf (Best) allowing FR as BEST
- Audio and video intercoms always VoIP compatible, video intercom is video over IP compatible (desktop VoIP station) and mobile device compatible
- Assistance beacons (Best)
- All VSS camera and PACS panel power provided by network switches with PoE (Better); lock power provided by PoE++ (Best)

Location	System	Description	Good	Better	Best
Elevated Rail Tracks and Platform	VSS	Outdoor Fixed Dome Network Cameras HDTV 1080p, PoE for Platform and Track Recording and Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	ІСТ	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	Comm	Outdoor Emergency Call Audio Station	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP
	ІСТ	Emergency Call Station Power Source	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	Perimeter	Acoustic Trouble/Vandalism Sensor	Not Required	Included, Connected to Comm or Perimeter	Automatic VOIP Messaging + "Better" Features

В





9 Underground Rail Tracks & Platform

Indoor waiting area and exit area for rail passengers. May contain seating areas.

- Same as
 ELEVATED RAIL TRACKS & PLATFORM
- Outdoor cameras' quantity and placement is 60ppf (Good), 80ppf (Better), 120ppf (Best) allowing FR as BEST Audio and video intercoms always VoIP compatible, video intercom is video over IP compatible (desktop VoIP station) and mobile device compatible
- Assistance beacons (Best)
- All VSS camera and PACS panel power provided by network switches with PoE (BETTER); Lock power provided by PoE++ (BEST)

Location	System	Description	Good	Better	Best
9 Underground Rail Tracks and Platform	vss	Outdoor Fixed Dome Network Cameras HDTV 1080p, PoE for Platform and Track Recording and Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	ІСТ	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	Comm	Outdoor Emergency Call Audio Station	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP
	ІСТ	Emergency Call Station Power Source	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	Perimeter	Acoustic Trouble/Vandalism Sensor	Not Required	Included, Connected to Comm or Perimeter	Automatic VOIP Messaging + "Better" Features

10 Bike Share Location

Outdoor automated canopy for bike share customers to perform bikeshare transactions including pickup and drop off.

• Outdoor cameras' quantity and placement is 60ppf (Good), 80ppf (Better), 120ppf (Best) allowing FR as BEST

Location	System	Description	Good	Better	Best
Bike Share Location	vss	Qty (2) Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Bike Area Recording and Outdoor Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	ІСТ	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch



🕕 Data Center

Operations and storage for data and network devices required to operate the station.

- VSS cameras: 60ppf (Good), 80ppf (Better), 120ppf (Best) allowing FR as BEST entry and exit
- Entry/exit card readers for electronic audit trail, synchronized with VSS cameras (All)
- Emergency egress hardware with both alert and REX connection at PACS panel (All)

Location	System	Description	Good	Better	Best
Data Center	VSS	Qty (2) Indoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry Recording	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	ІСТ	Connection to PoE Port(s) for Above at ICT EQ Closet	Via Port on PoE Network Switch	Via Port on PoE Network Switch	Via Port on PoE Network Switch
	PACS	Video Intercom With VOIP (Entry)	With Audio/Video Streaming to VOIP Stations and Mobile Devices	With Integrated Card Reader + "Good" Features	With Facial Recognition + "Better" Features
	PACS	Card Reader (EA Entry, Both Entry/ Exit With Anti-Passback)	Card Reader (EA Entry)	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP
	PACS	Door Status	Door Status Contacts (External)	Door Status Contacts Plus Electric Lock Status Monitoring (Built into Lock)	Local Audio/Visual Alarm + "Better" Features
	PACS	Emergency Egress Device (EA Entry)	Egress Hardware W/ Connection to PACS Panel Rex Port	Egress Hardware W/ Connection to PACS Panel Rex Port	Built-In Locking System, Door Status, Lock Status Plus "Better" Feature
	PACS	Electric Lock Power Source (EA Entry)	External Unmanaged Power Supply + Connection to Fire Alarm and Life Safety System	Includes Battery Backup + "Good" Features	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	ІСТ	PACS Panel Power Source (EA Entry)	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)

12 PUBLIC SAFETY COMMAND CENTER

Operations office for monitoring of security and safety equipment and communication with emergency responders.

• Entry/exit card readers for access control and electronic audit trail, synchronized with VSS cameras (All)

Audio and video intercoms always VoIP compatible, video intercom is video over IP compatible (desktop VoIP station) and mobile device compatible.

Location	System	Description	Good	Better	Best
Public Safety Command Center	VSS	Qty (2) Indoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry Recording	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	ІСТ	Connection to PoE Port(s) for Above at ICT EQ Closet	Via Port on PoE Network Switch	Via Port on PoE Network Switch	Via Port on PoE Network Switch
	PACS	Video Intercom With VOIP (Entry)	With Audio/Video Streaming to VOIP Stations and Mobile Devices	With Integrated Card Reader + "Good" Features	With Facial Recognition + "Better" Features
	PACS	Card Reader (EA Entry, Both Entry/ Exit With Anti-Passback)	Card Reader (EA Entry)	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP
	PACS	Door Status	Door Status Contacts (External)	Door Status Contacts Plus Electric Lock Status Monitoring (Built into Lock)	Local Audio/Visual Alarm + "Better" Features
	PACS	Emergency Egress Device (EA Entry)	Egress Hardware W/ Connection to PACS Panel Rex Port	Egress Hardware W/ Connection to PACS Panel Rex Port	Built-In Locking System, Door Status, Lock Status Plus "Better" Feature
	PACS	Electric Lock Power Source (EA Entry)	External Unmanaged Power Supply + Connection to Fire Alarm and Life Safety System	Includes Battery Backup + "Good" Features	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	ІСТ	PACS Panel Power Source (EA Entry)	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)

В





G-B-B Project Value Spreadsheet







Location	Similar	Device Sensor	Description	Good	Better	Best
Main Station Entrance	VSS	Outdoor IP Camera	Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Station Surveillance, Qty to Be Adjusted, Depending on Coverage	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Object Detection, Plus "Better" Features
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	PACS	Outdoor Proximity Card Reader	Card Reader (EA Entry)	Card Reader (EA Entry)	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP
	PACS	Door Contact	Door Status Monitoring	Door Status Contacts (External)	Door Status Contacts Plus Electric Lock Status Monitoring (Built into Lock)	Local Audio/Visual Alarm + "Better" Features
	PACS	Exit Detector Above Door or Push-Type Egress Harware	Entry and Egress Devices for Sliding Doors	Exit Motion Sensor Plus Egress Hardware	Egress Hardware W/ Connection to PACS Panel Rex Port	Built-In Locking System, Door Status, Lock Status Plus "Better" Feature
	PACS	Power Supply for Locks and/or Sliding Door	Automatic Sliding Doors Power Source	External Unmanaged Power Supply + Connection to Fire Alarm and Life Safety System	Includes Battery Backup + "Good" Features	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	PACS Panel Power Source	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	PACS	Door Locking System Control (Individual or All Doors)	Lockdown (Active Assailant), Door Release Controls (Workplace Violence)	Not Required	Connection to Lockdown/Release Controls (Requires Bond Sensor) Done With Electrified Lockset)	Interface to VOIP System + "Better" Features
	PACS	Outdoor Audio/Visual Entry Panel	Outdoor Audio Intercom With VOIP	With Audio to VOIP Stations and Mobile Devices	With Integrated Card Reader + "Good" Features	With Integrated Card Reader + "Good" Features
	PACS	Access Intercom	Entry/Exit Outdoor Video Intercom With VOIP	Not Required	Not Required	Integrated Video Sensor Has Facial Recognition
	Perimet	r Trouble Sensors	Acoustic Gunshot, Vandalism and Vehicle Crash Sensor	Not Required	Automatic VOIP Messaging	Automatic VOIP Messaging
2 Transit Vehicle Entry	VSS	Outdoor IP Camera	Qty (2) Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry Recording and Outdoor Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	VSS	Outdoor IP Vehicle License Plate Camera	Outdoor Fixed Camera With LPR Analytics Software Detects Vehicle Arrival	Not Required	Not Required	Camera Captures Vehicle Arrivals for Entry and Alert Via License Plate
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	Parking	Vehicle Sensor	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)
3 Transit Vehicle Exit	VSS	Outdoor IP Camera	Qty (2) Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry Recording and Outdoor Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	VSS	Outdoor IP Vehicle License Plate Camera	Outdoor Fixed Camera With LPR Analytics Software Detects Vehicle Arrival	Not Required	Not Required	Camera Capture Vehicle Arrivals for Entry and Alert Via License Plate
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	Parking	Vehicle Sensor	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)	Lorawan Vehicle Presence Sensor for Safety (Entry/Exit)



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Location	Similar	System	Device. Sensor	Description	Good	Better	Best
Customer Parking		VSS	Outdoor IP Camera	Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Parking Area Surveillance, Qty to Be Adjusted, Depending on Coverage	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Object Detection, Plus "Better" Features
		ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port(s) for Above at ICT EQ Closet	Via Port on PoE Network Switch	Via Port on PoE Network Switch	Via Port on PoE Network Switch
		PACS	Access Intercom	Outdoor Video Intercom With VOIP	Not Required	Not Required	Integrated Video Sensor Has Facial Recognition
		Comm	Emergency Beacon	Outdoor Emergency Call Audio Station	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP
		ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port(s) for Above at ICT EQ Closet	Via Port on PoE Network Switch	Via Port on PoE Network Switch	Via Port on PoE Network Switch
		Perimeter	Trouble Sensors	Acoustic Gunshot, Vandalism and Vehicle Crash Sensor	Not Required	Automatic VOIP Messaging	Automatic VOIP Messaging
		Parking	Parking Sensors	Lorawan Parking Sensor for Parking Capacity	Not Required	Not Required	Lorawan Parking Sensor for Parking Capacity
		Parking	Carbon Monoxide (CO) and Nitrogen Dioxide (NO ₂) Detection	Toxic Gas Detection Control Panel With Remote Sensor/Audio/Visual Devices	Not Required	Not Required	Toxic Gas Detection Control Panel
5 Bus Parking Bay		VSS	Outdoor IP Camera	Qty (2) Indoor Fixed Dome Network Camera HDTV 1080p,Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry Recording and Bus Bay Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
		ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
		PACS	Outdoor Proximity Card Reader	Card Reader (EA Entry)	Card Reader (EA Entry)	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP
		PACS	Door Contact	Door Status Monitoring	Door Status Contacts (External)	Door Status Contacts Plus Electric Lock Status Monitoring (Built into Lock)	Local Audio/Visual Alarm + "Better" Features
		PACS	Exit Detector Above Door or Push-Type Egress Harware	Entry and Egress Devices for Sliding Doors	Exit Motion Sensor Plus Egress Hardware	Egress Hardware W/ Connection to PACS Panel Rex Port	Built-In Locking System, Door Status, Lock Status Plus "Better" Feature
		PACS	Power Supply for Locks and/or Sliding Door	Automatic Sliding Doors Power Source	External Unmanaged Power Supply + Connection to Fire Alarm and Life Safety System	Includes Battery Backup + "Good" Features	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
		ІСТ	Network Switch Port With Power Over Ethernet (PoE)	PACS Panel Power Source	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
		PACS	Door Locking System Control (Individual or All Doors)	Lockdown (Active Assailant), Door Release Controls (Workplace Violence)	Not Required	Connection to Lockdown/Release Controls (Requires Bond Sensor) Done With Electrified Lockset)	Interface to VOIP System + "Better" Features
		PACS	Outdoor Audio/Visual Entry Panel	Outdoor Audio Intercom With VOIP	With Audio to VOIP Stations and Mobile Devices	With Integrated Card Reader + "Good" Features	With Integrated Card Reader + "Good" Features
		PACS	Access Intercom	Entry/Exit Outdoor Video Intercom With VOIP	Not Required	Integrated Audio Sensor; Emergency Call	Integrated Video Sensor Has Facial Recognition; Emergency Call
		Parking	Carbon Monoxide (CO) and Nitrogen Dioxide (NO ₂) Detection	Toxic Gas Detection Control Panel With Remote Sensor/Audio/Visual Devices	Not Required	Not Required	Toxic Gas Detection Control Panel



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Simi	lar					
Location to	System	Device, Sensor	Description	Good	Better	Best
6 Bus Stop Waiting Area	VSS	Indoor IP Cameras, Entry and Exit	Qty (2) Indoor Fixed Dome Network Camera HDTV 1080p, PoE for Bus Waiting Area Recording	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Plus Qty (2) Additional Facial Recognition Entry Recording Licenses, Plus "Better" Features
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	PACS	Audio/Visual Entry Panel	Video Intercom With VOIP	With Audio/Video Streaming to VOIP Stations and Mobile Devices	With Integrated Card Reader + "Good" Features	With Facial Recognition + "Better" Features
	PACS	Proximity Card Reader	Card Reader (EA Entry)	Card Reader (EA Entry)	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP
	PACS	Door Contact	Door Status Monitoring	Door Status Contacts (External)	Door Status Contacts Plus Electric Lock Status Monitoring (Built into Lock)	Local Audio/Visual Alarm + "Better" Features
	PACS	Exit Detector Above Door or Push-Type Egress Harware	Entry and Egress Devices for Sliding Doors	Exit Motion Sensor Plus Egress Hardware	Egress Hardware W/ Connection to PACS Panel Rex Port	Built-In Locking System, Door Status, Lock Status Plus "Better" Feature
	PACS	Power Supply for Locks and/or Sliding Door	Automatic Sliding Doors Power Source	External Unmanaged Power Supply + Connection to Fire Alarm and Life Safety System	Includes Battery Backup + "Good" Features	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	PACS Panel Power Source	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	PACS	Door Locking System Control (Individual or All Doors)	Lockdown (Active Assailant), Door Release Controls (Workplace Violence)	Not Required	Connection to Lockdown/Release Controls	Interface to VOIP System + "Better" Features
	PACS	Access Intercom	Entry/Exit Outdoor Video Intercom With VOIP	Not Required	Integrated Audio Sensor; Emergency Call	Integrated Video Sensor Has Facial Recognition; Emergency Call
	Parking	Carbon Monoxide (CO) and Nitrogen Dioxide (NO ₂) Detection	Toxic Gas Detection Control Panel With Remote Sensor/Audio/Visual Devices	Not Required	Not Required	Toxic Gas Detection Control Panel
Other Station Entry/Exit	VSS	Outdoor IP Camera	Qty (2) Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry Recording and Outdoor Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	VSS	Indoor IP Camera	Qty (2) Indoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry/Exit Recording and Surveillance Of Full Height Turnstiles	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	PACS	Outdoor Emergency Call Audio Station	Outdoor Emergency Call Audio Station Entry/ Exit Outdoor Audio Intercom With VOIP	Emergency Call or Duress Code Available	Emergency Call or Duress Code Available Integrated Audio Sensor; Emergency Call	Integrated Video Sensor Has Facial Recognition; Emergency Call
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port(s) for Above at ICT EQ Closet	Via Port on PoE Network Switch	Via Port on PoE Network Switch	Via Port on PoE Network Switch
B Elevated Rail Tracks and Platform	VSS	Outdoor IP Cameras	Outdoor Fixed Dome Network Cameras HDTV 1080p, PoE for Platform and Track Recording and Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	Comm	Emergency Beacon	Outdoor Emergency Call Audio Station	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Emergency Call Station Power Source	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	Perimeter	Outdoor Microphone or Acoustic Sensor	Acoustic Trouble/Vandalism Sensor	Not Required	Included, Connected to Comm or Perimeter	Automatic VOIP Messaging + "Better" Features



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Simil Location to	ar System	Device, Sensor	Description	Good	Better	Best
9 Underground Rail Tracks and Platform	VSS	Outdoor IP Cameras	Outdoor Fixed Dome Network Cameras HDTV 1080p, PoE for Platform and Track Recording and Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
	Comm	Emergency Beacon	Outdoor Emergency Call Audio Station	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP	Outdoor Emergency Call Audio Station; Audio Only With Flashing Strobe and Connection to VOIP
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Emergency Call Station Power Source	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	Perimeter	Outdoor Microphone or Acoustic Sensor	Acoustic Trouble/Vandalism Sensor	Not Required	Included, Connected to Comm or Perimeter	Automatic VOIP Messaging + "Better" Features
Bike Share Location	VSS	Outdoor IP Camera	Qty (2) Outdoor Fixed Dome Network Camera HDTV 1080p, PoE for Bike Area Recording and Outdoor Surveillance	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port for Above at ICT EQ Closet	Via External PoE Injector	Via Port on PoE Network Switch	Via Port on PoE++ (802.3bt) Network Switch
Data Center	VSS	Indoor IP Cameras	Qty (2) Indoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry Recording	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port(s) for Above at ICT EQ Closet	Via Port on PoE Network Switch	Via Port on PoE Network Switch	Via Port on PoE Network Switch
	PACS	Audio/Visual Entry Panel	Video Intercom With VOIP (Entry)	With Audio/Video Streaming to VOIP Stations and Mobile Devices	With Integrated Card Reader + "Good" Features	With Facial Recognition + "Better" Features
	PACS	Outdoor Proximity Card Reader	Card Reader (EA Entry, Both Entry/Exit With Anti-Passback)	Card Reader (EA Entry)	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP
	PACS	Door Contact	Door Status	Door Status Contacts (External)	Door Status Contacts Plus Electric Lock Status Monitoring (Built into Lock)	Local Audio/Visual Alarm + "Better" Features
	PACS	Exit Detector Above Door or Push-Type Egress Harware	Emergency Egress Device (EA Entry)	Egress Hardware W/ Connection to PACS Panel Rex Port	Egress Hardware W/ Connection to PACS Panel Rex Port	Built-In Locking System, Door Status, Lock Status Plus "Better" Feature
	PACS	Power Supply for Locks	Electric Lock Power Source (EA Entry)	External Unmanaged Power Supply + Connection to Fire Alarm and Life Safety System	Includes Battery Backup + "Good" Features	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	PACS Panel Power Source (EA Entry)	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
Public Safety Command Center	VSS	Indoor IP Cameras	Qty (2) Indoor Fixed Dome Network Camera HDTV 1080p, PoE for Entry Recording	60 PPF on Target Minimum, Wide Dynamic Range	80 PPF on Target Minimum, Ultra Low Light Sensitivity + "Good" Features	120 PPF Minimum, Facial Recognition and/or Object Detection, Plus "Better" Features
	ІСТ	Network Switch Port With Power Over Ethernet (PoE)	Connection to PoE Port(s) for Above at ICT EQ Closet	Via Port on PoE Network Switch	Via Port on PoE Network Switch	Via Port on PoE Network Switch
	PACS	Audio/Visual Entry Panel	Video Intercom With VOIP (Entry)	With Audio/Video Streaming to VOIP Stations and Mobile Devices	With Integrated Card Reader + "Good" Features	With Facial Recognition + "Better" Features
	PACS	Outdoor Proximity Card Reader	Card Reader (EA Entry, Both Entry/Exit With Anti-Passback)	Card Reader (EA Entry)	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP	Note: Video Intercom Has Integrated Card Reader, VOIP, Video Over IP
	PACS	Door Contact	Door Status	Door Status Contacts (External)	Door Status Contacts Plus Electric Lock Status Monitoring (Built into Lock)	Local Audio/Visual Alarm + "Better" Features
	PACS	Exit Detector Above Door or Push-Type Egress Harware	Emergency Egress Device (EA Entry)	Egress Hardware W/ Connection to PACS Panel Rex Port	Egress Hardware W/ Connection to PACS Panel Rex Port	Built-In Locking System, Door Status, Lock Status Plus "Better" Feature
	PACS	Power Supply for Locks	Electric Lock Power Source (EA Entry)	External Unmanaged Power Supply + Connection to Fire Alarm and Life Safety System	Includes Battery Backup + "Good" Features	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)
	ICT	Network Switch Port With Power Over Ethernet (PoE)	PACS Panel Power Source (EA Entry)	External Unmanaged Power Supply	Via External PoE Injector (No Lock Power)	Via Port on PoE++ (802.3bt) Network Switch (Includes Lock Power)



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