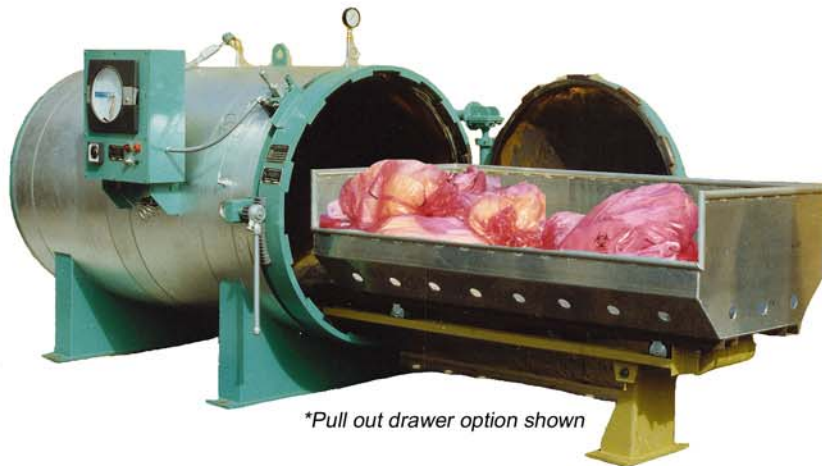


## AS-SERIES Medical Waste Sterilizer



*\*Pull out drawer option shown*

- *Specification Sheet*
- *Sterilizer Operating Procedure*
- *Payback Period Analysis*
- *Typical Equipment Layout Drawings*



*Cart Lift Option*

## MARK-COSTELLO WASTE STERILIZER

### SPECIFICATION SHEET

The Mark-Costello Waste Sterilizer is designed and manufactured in accordance with the following specifications:

Vessel shall be built in accordance with requirements of ASME Pressure Vessel Code Section VIII, Division I.

Vessel shall be equipped with a wedge-lock (breach-lock) quick opening door. The wedges shall be helical tapered wedges which are true segments of square threads. Left or right hand door optional. The door shall be fitted with a lever-operated rack and pinion assembly with reversible ratchet which shall facilitate each opening and closing of the door locking ring with a minimum effort.

Sterilizer shall be equipped with the following safety features.

1. High pressure safety relief valve which meets the requirements of ASME.
2. Door equipped with a quadruple safety mechanism to prevent accidental opening while under pressure, and also to prevent incomplete closing and locking prior to starting sterilizer cycle. This mechanism consist of (a) heavy duty mechanical locking lever, (b) manually operated steam vent and warning valve, (c) steam operated valve interlock cylinder with locking pin, (d) electric limit switch. All four components are interlocked with each other.

Entire control panel shall be Underwriters' Laboratories listed and labeled.

Control Panel shall be integrally mounted on the vessel, and shall be capable of performing automatic sterilization cycles. Panel shall be equipped with time/temperature chart recorder, timer, control thermostat, and start/stop controls. Start control shall be key-lock start. Stop control shall be red push button, and shall be capable of overriding time cycle. Both shall be operable from the outside of control panel, and shall be heavy duty, commercial grade, oil tight. Control enclosure shall be NEMA 4, and shall be UL listed. Chart recorder shall be 10" diameter, and shall be accessible from the front of the panel to facilitate the changing of charts, and shall be secured with a built-in lock, operated by a separate key. Timer shall have a 0 to 4 hour range, shall be accessible from the front of the panel, and shall be adjustable via a separate key. Timer shall commence timed cycle only after having first reached operating temperature.

Sterilizer shall be equipped with a solenoid operated steam control valve and solenoid operated steam blow down valve.

## **SPECIFICATION SHEET** (Cont'd.)

Sterilizer shall be equipped with the following miscellaneous accessories:

1. Internal steam diffuser.
2. Heavy duty industrial temperature and pressure gauges, easily visible by operator when opening door.
3. Load platform of heavy duty industrial welded bar grating capable of withstanding 500 lbs. per linear foot for manually loaded units, or heavy duty tracks for cart loaded or drawer loaded units.
4. Stainless steel condensate drain screen, removable for easy cleaning.
5. Line strainer and thermostatically controlled steam trap in condensate drain line for controlled purging of air and steam condensate. Line strainer shall be a basket type with stainless steel basket easily removable for cleaning.
6. Full insulation. The sterilizer body shall be insulated with 1½" thick fiberglass, protected by a jacket of stucco-embossed aluminum secured with stainless steel bands. Front and rear head shall be insulated with fiberglass and protected from damage by solid steel insulation heads.

Sterilizer shall be equipped with automatic blow down features for rapid cool down.

Sterilizer may be equipped with optional carts for easier handling of large volumes of waste (aluminum or stainless steel).

Sterilizer may be equipped with optional aluminum pull-out drawer.

Sterilizer may be equipped with hydraulic system to lock/unlock the door locking ring.

### **ON-SITE REQUIRMENTS**

Steam:	60 PSIG
Electrical:	115 Volts, 5 Amps
Drain:	A floor drain or floor sink connected to the sanitary sewer.
Venting:	Appropriate exit for our vent line and blow down line, per Mark-Costello drawings.

# **The Mark-Costello Co. Medical Waste Steam Sterilizer**

## **Sterilizer Operating Procedure**

1. Follow procedures as established by the governing regulatory agencies (local, state and or federal) for the collection and separation of biohazardous waste materials.
2. Only properly trained personnel will operate and maintain the sterilizer.
3. Place polypropylene autoclavable cart liner into cart prior to loading biohazardous waste bags into cart
4. Place red bags into each cart. Use automated cart tipper whenever possible to minimize contact with the biohazardous waste bags. If hand-loading is required, operator should be wearing required Personal Protective Equipment as designated by the Employee Health & Safety Manual.
5. Check pressure gauge above Sterilizer door to confirm that there is no pressure in vessel. Lift Safety Switch at upper right hand side of Sterilizer door to "UP" position. If any vapor emits from pipe connected to Safety Switch, wait until no vapor is present before proceeding further.
6. Open door by rotating wedge lock ring into un-locked position by using ratchet-operated rack and pinion door locking device.
7. Carefully open Sterilizer door. Use hold-back device to keep door open during loading and unloading.
8. Wearing heavy work gloves, lower fold-down cart ramp to floor in front of Sterilizer.
9. Load filled sterilizer carts into sterilizer by rolling them up the fold-down ramp. Use push pole to ensure that carts are pushed into sterilizer as far as it can go.
10. Inspect door seal gasket for proper alignment and insertion. Also look for cracks or tears which could allow steam to escape. Notify manager of any problems found.
11. Make sure that door face that contacts seal is clean and free of any foreign material.

12. Once the last cart is loaded, raise fold-down ramp, close door and rotate wedge lock ring into locked position by using ratchet-operated rack and pinion door locking device.
13. Once door locking ring has fully rotated and wedge locks are in position, engage safety switch by closing the Safety Switch.
14. After locking valves are secure, system may be started by turning key-lock starter key to the right. This automatically starts the processing cycle. Once cycle is set into motion, a red "on" light is visible throughout cycle. An emergency "stop" button is available for use in case of need. If this button is utilized, the system will shut down immediately. The system may be re-energized by again turning the key-lock start, but note that cycle restarts from the beginning. (Cycle time may be set by user's preference, however, it must be for a minimum of 30 minutes) Timed portion of cycle starts only when autoclave reaches sterilization temperature.
15. Once sterilization cycle is completed, the unit will shut off automatically and, the sterilizer will release the steam from the vessel automatically. Unit should be allowed to depressurize and cool down. Allow approximately 10-15 minutes.
16. At the end of the exhaust phase, and the pressure gauge reads 0 psi-the cycle will be complete. Open Sterilizer door in accordance with steps 5-8 above and then remove carts from Sterilizer.
17. Carts and sterilized waste will still be hot or warm depending upon the amount of time waited after end of cycle. Use caution and appropriate personal protective equipment (heavy work gloves) in handling carts or waste.
18. Move carts to hydraulic cart dumper to transfer waste into compactor.

Note: The sterilizer is equipped with an electric limit switch activated by a locking lever, which closes a ball valve on the door interlock safety device. The sterilization cycle will not commence until the ball valve is closed safely interlocking the rotating lock ring and activating the limit switch. The autoclave will shut off and recycle to the pre-start status if the ball valve is opened or if electric power to the sterilizer is interrupted, or if the "CLEAR" key is pressed. On restart, the sterilizer will start at the beginning of the cycle and will not resume at the point in the cycle where it was stopped. In addition, a locking pin is actuated at 2 psi which prevents the locking lever from being unlocked.

# Payback Period Analysis

*Comparing the Cost of Hauling RMW  
To Operating an On-site Autoclave Treatment System  
For: Your Town Memorial Medical Center*

## UTILITIES

Utility costs for a Mark-Costello Sterilizer average less than \$2.00 per cycle. Assuming the facility generates 50,000 pounds of RMW per month and the AS515 holds 1,125 pounds per cycle, it will require 45 cycles per month to process your entire load. Usage of steam and electricity will cost about **\$100** per month.

## LABOR

The operator will spend about 25 minutes per cycle at the Sterilizer adding up to 19 hours per month. At a rate of \$13.50 per hour the monthly labor cost would be about **\$257** per month.

## SUPPLIES

Autoclavable polypropylene film cart liners run about \$1.50 each. With three carts per cycle, liner cost will be less than \$4.50 per cycle. Monthly liner cost will be about **\$203**.

## MAINTENANCE

One of the advantages of the Mark-Costello Sterilizer is its virtually maintenance-free operation. A few cartridges of grease and a new door gasket every 200 cycles will run less than **\$100** per month.

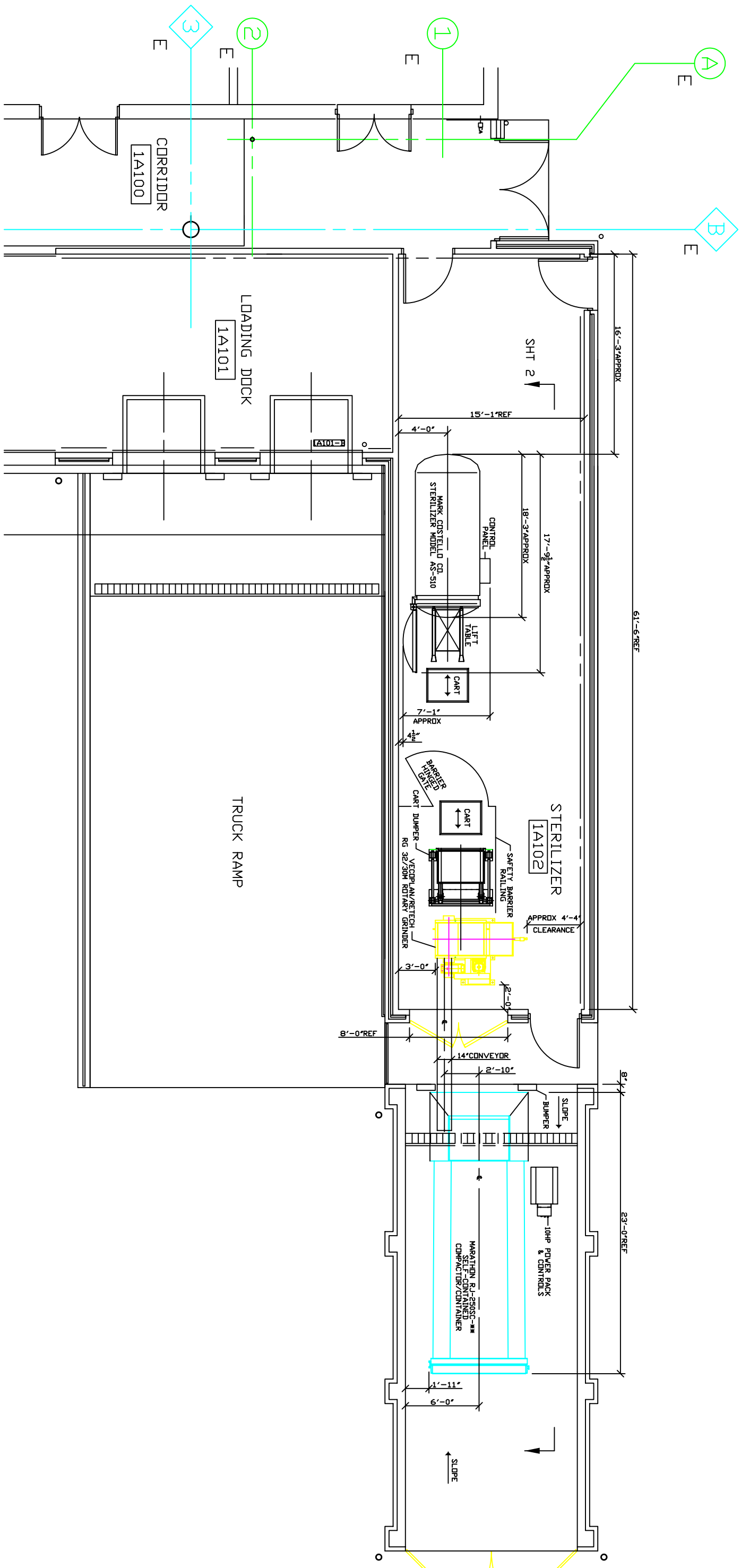
## LANDFILL DISPOSAL OF TREATED WASTE

The sterilized waste will be transferred to the compactor for landfill disposal. Based on regional averages, the cost for transportation and disposal of general solid waste is about \$60 per ton. This rate applied to 50,000 pounds per month translates to **\$1,500** per month for the disposal of treated regulated medical waste.

Adding all of the above together yields a total cost of operating a Mark-Costello Sterilizer at **\$2,160** per month, or \$0.043 per pound. Your current cost of having your RMW hauled away is about **\$15,000** per month (based on a \$ .30 per pound approximation).

*Switching to a Mark-Costello Sterilizer would positively impact the facility's cash flow by **\$12,840** per month, yielding over **\$154,080** in savings in the first year, and over **\$2,000,000** over the life of the equipment (15 years).*

*The Mark-Costello Sterilizer System will pay for itself in less than 12 months (assuming an installed equipment cost of \$150,000).*



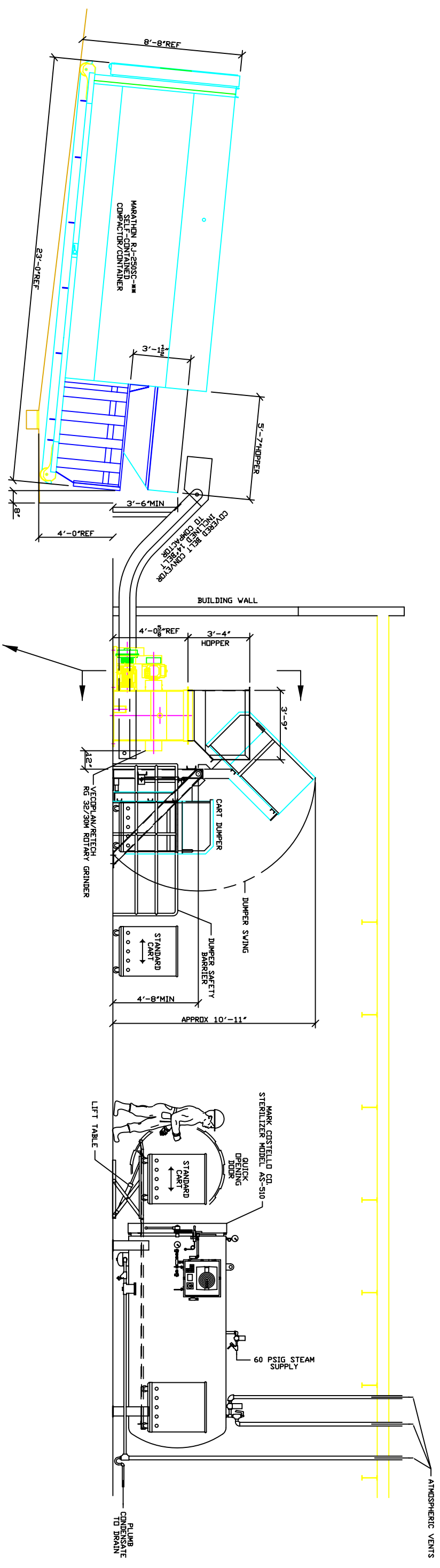
PARTIAL PLAN VIEW

**THE MARK-COSTELLO CO.**  
 1145 DOMINIQUEZ STREET, CARSON, CA. 90746 • (310) 637-1851

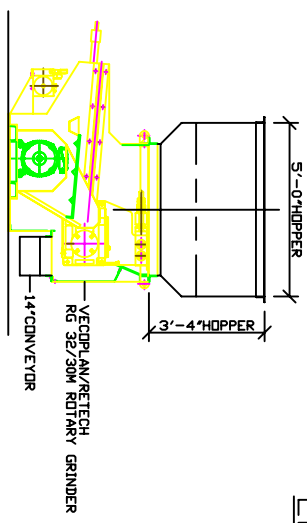
**MG**  
 TITLE  
 MEDICAL WASTE SYSTEM

typical layout

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REV	DATE	DESCRIPTION	BY	CHK	APP	SCALE
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0	12/03/03	FDR PROPOSAL	DS		DS	
REV	DATE	DESCRIPTION	BY	CHK	APP	SCALE



ELEVATION



1	10/27/04	REV'D TO MATCH FACILITY DWGS	DS		
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REV	DATE	DESCRIPTION	BY	CHK/APPR	SCALE

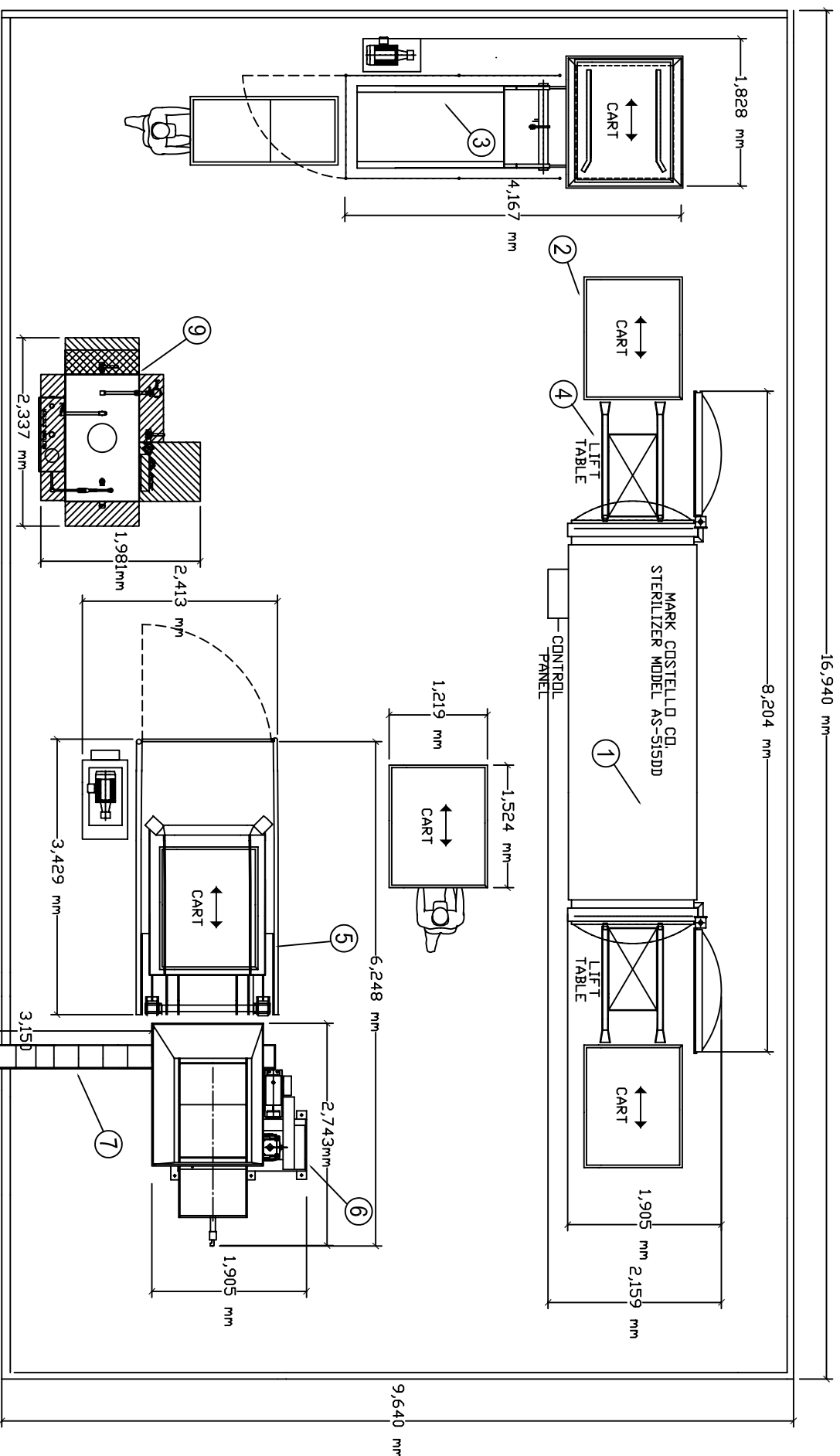
  

DRWN BY:	DATE:	DS	OUR ORDER NO.	DRAWING NO.	REVISION
	12/05/03	AS NOTED	*****	D-030041	SHT 2 OF 2

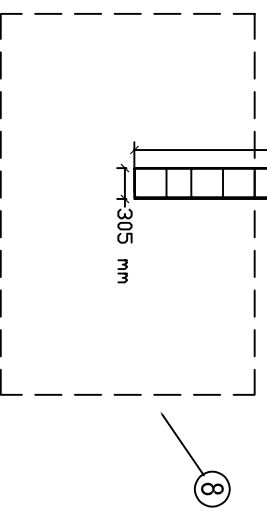
<b>THE MARK-COSTELLO CO.</b> 1145 DOMINIQUEZ STREET, CARSON, CA. 90746 · (310) 637-1851	
CUSTOMER:	<b>MC</b> typical layout elevation MEDICAL WASTE SYSTEM



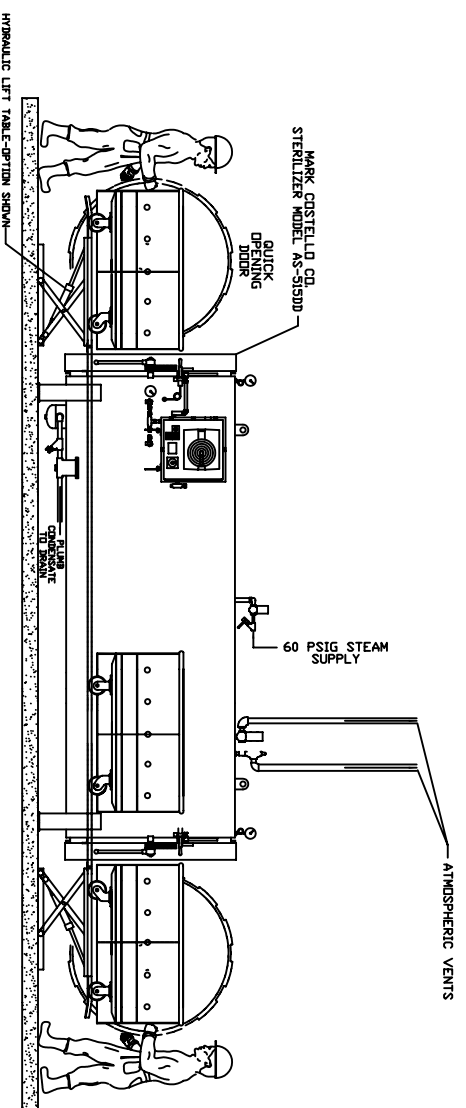
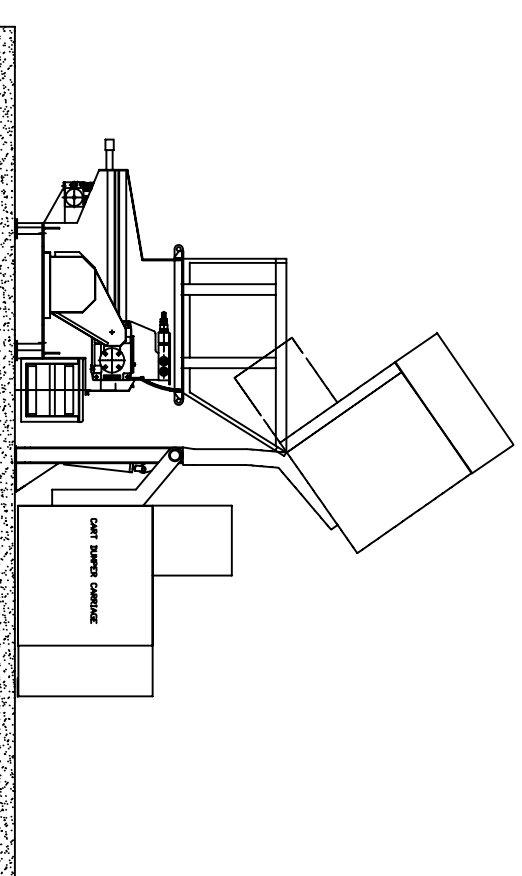


- LEGEND**
- ① MC WASTE STERILIZER MODEL AS515DD
  - ② HIGH VOLUME AUTOCLAVE CARTS
  - ③ CART TO CART DUMPER
  - ④ SCISSOR CART LOADER
  - ⑤ CART TO GRINDER DUMPER
  - ⑥ VECOPLAN RG32M GRINDER
  - ⑦ COVERED BELT CONVEYOR
  - ⑧ CONTAINER
  - ⑨ STEAM BOILER (BY OTHERS)

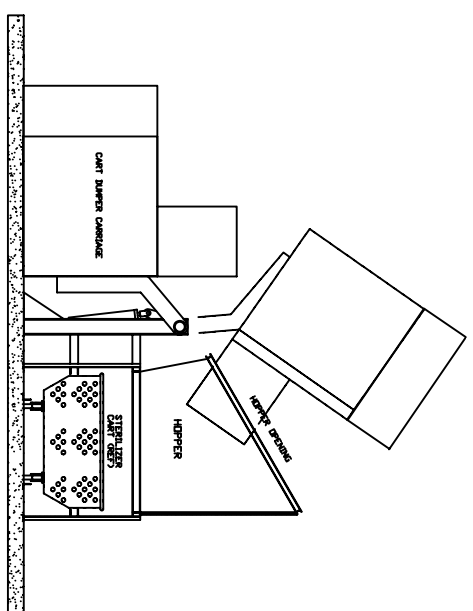
PLAN VIEW



CART TO SHREDDER/GRINDER DUMPER ELEVATION VIEW



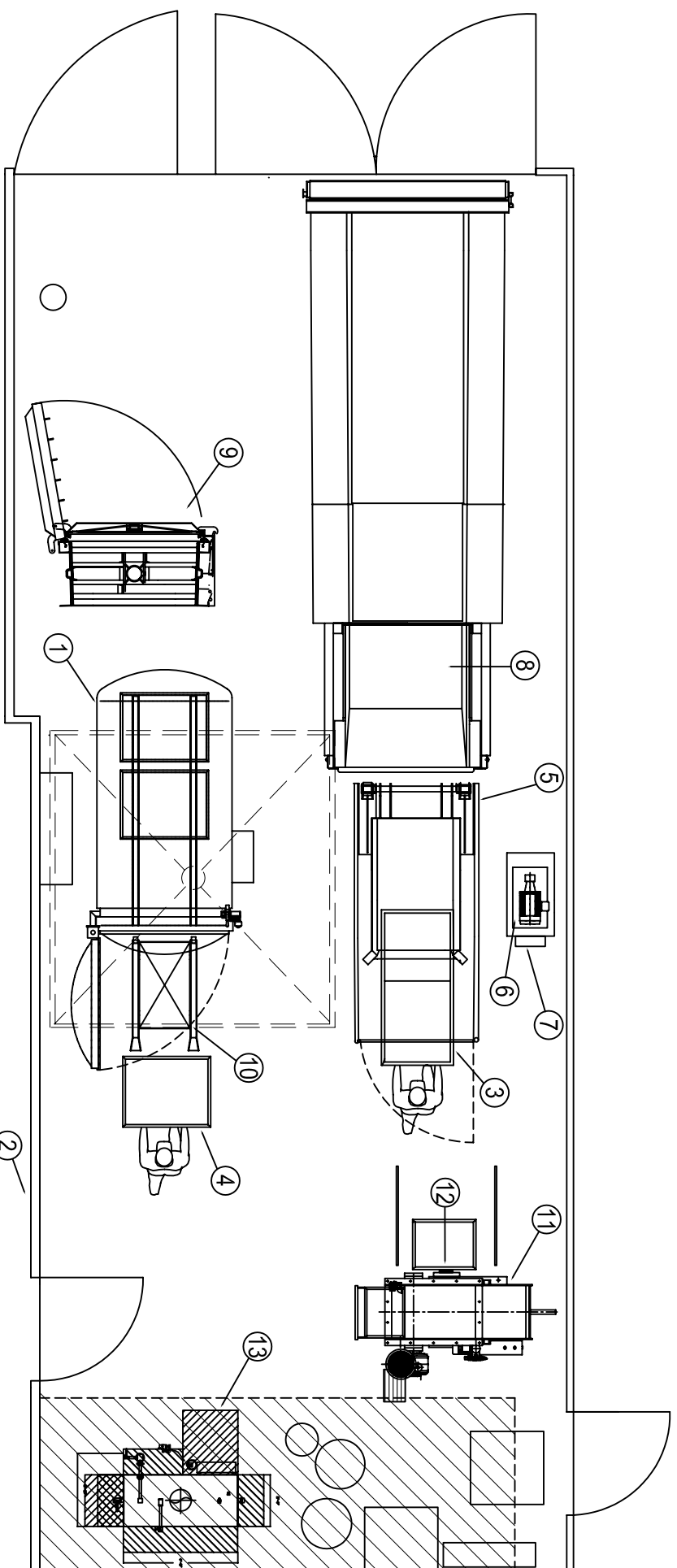
STERILIZER ELEVATION VIEW



CART TO CART DUMPER ELEVATION VIEW

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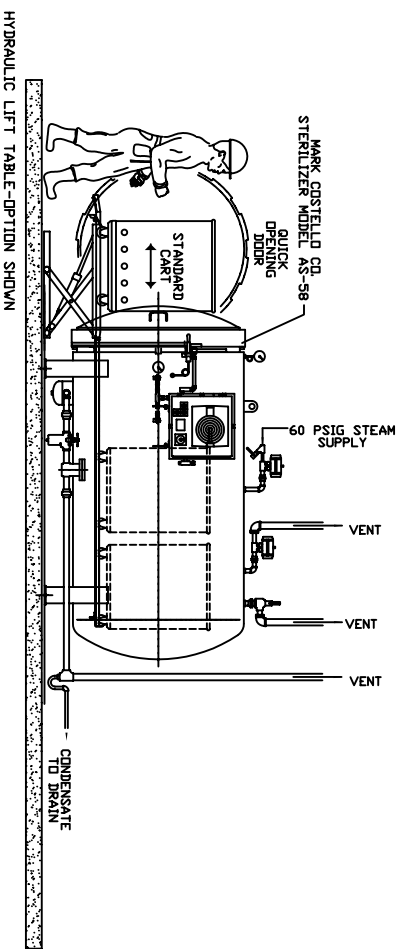
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		MARK-COSTELLO WASTE STERILIZER SYSTEM	
DR. MK	CAD.		
CK.	APP.		
DATE: 06-30-05			
SCALE: AS SHOWN			
TOL: + - 1/16			
DRAWING NO. 0605-012			
WWW.MARK-COSTELLO.COM			



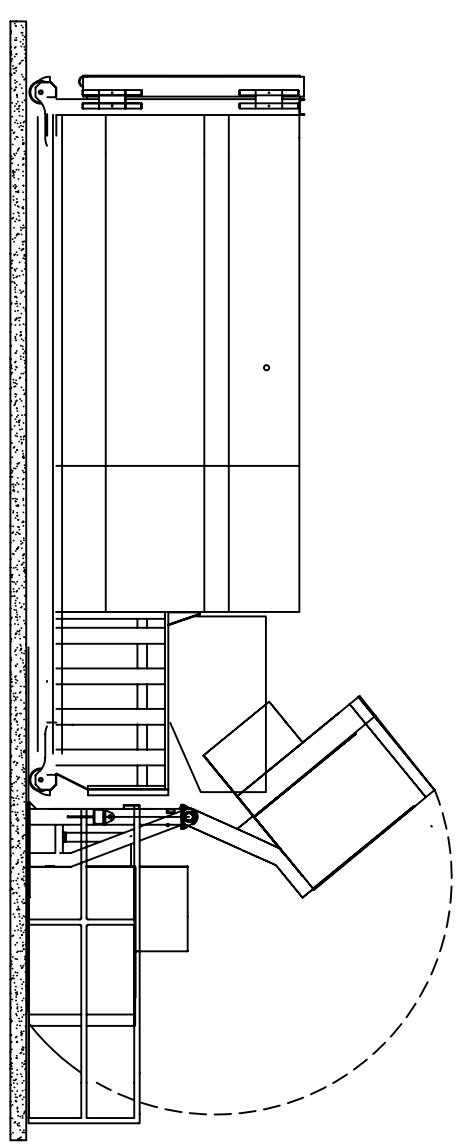
PLAN VIEW

**LEGEND**

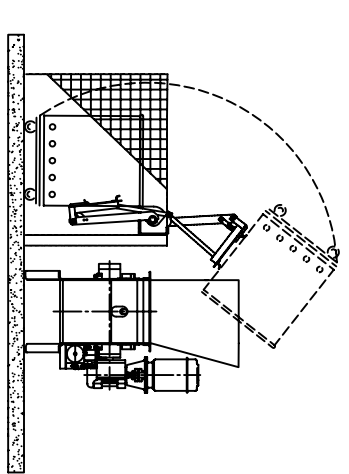
- ① MC MEDICAL WASTE STERILIZER MODEL AS58
- ② EXISTING CHAIN-LINK WALL TRASH ENCLOSURE
- ③ RUBBERMAID HOUSEKEEPING TRASH CONTAINER
- ④ MC STANDARD ALUMINUM CART
- ⑤ MC-HD HYDRAULIC CARRIAGE CART DUMPER
- ⑥ HYDRAULIC CARRIAGE DUMPER POWER PACK (5HP 3/60)
- ⑦ COMPACTOR-POWER PACK (10HP 3/60)
- ⑧ MARATHON RJ250SC SELF-CONTAINED TRASH COMPACTOR
- ⑨ EXISTING CARDBOARD/OCC VERTICAL BALER
- ⑩ MC HYDRAULIC CART LIFT
- ⑪ MC SHREDDER/GRINDER MODEL RG24M (20HP)
- ⑫ SHREDDER/GRINDER HYDRAULIC CART DUMPER
- ⑬ PARKER INDUSTRIAL PACKAGED STEAM BOILER 9.5HP



STERILIZER ELEVATION VIEW



COMPACTOR/CART DUMPER ELEVATION VIEW



SHARP-SHREDDER ELEVATION VIEW

TYPICAL LAYOUT  
MARK-COSTELLO MEDICAL WASTE STERILIZER SYSTEM

REV	DATE	DRAWING NO.	MK	RM
0		DESCRIPTION		

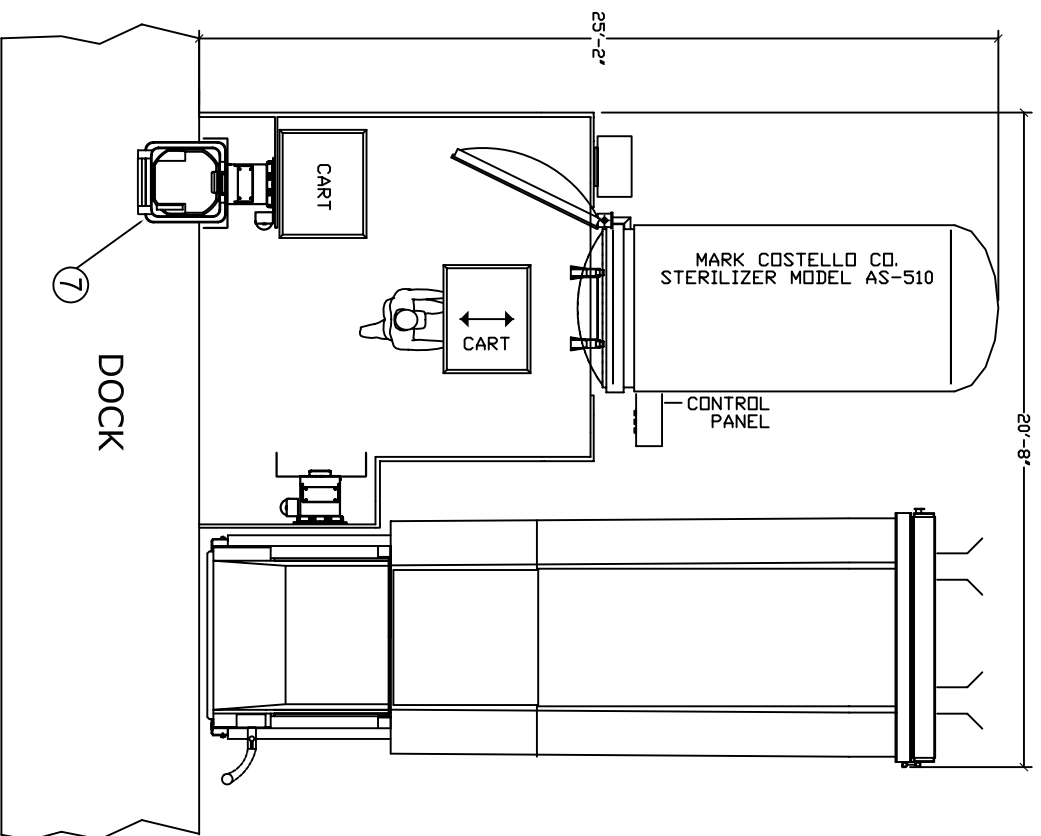
**M**  
**C**

MARK-COSTELLO CO.

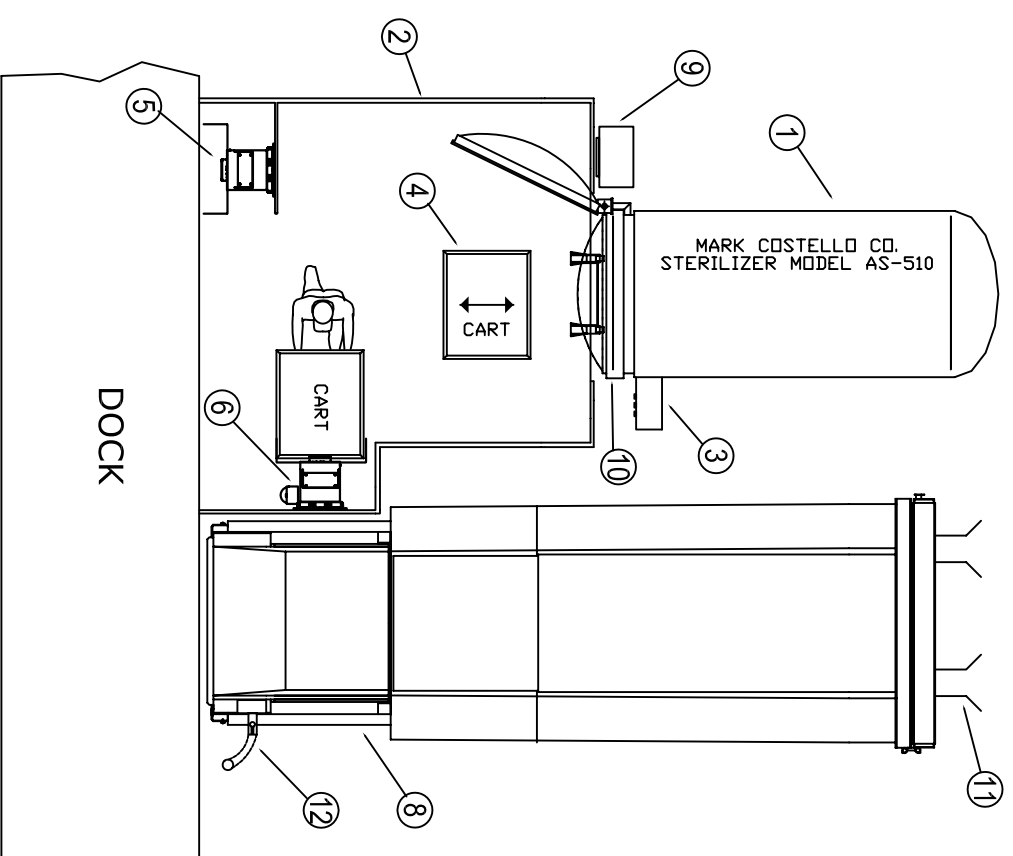
DRAWING NO. 0405-003

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DR. MK	CAD.
CK. RM	APP.
DATE: 04-25-05	
SCALE: AS SHOWN	
TOL: + - 1/16	



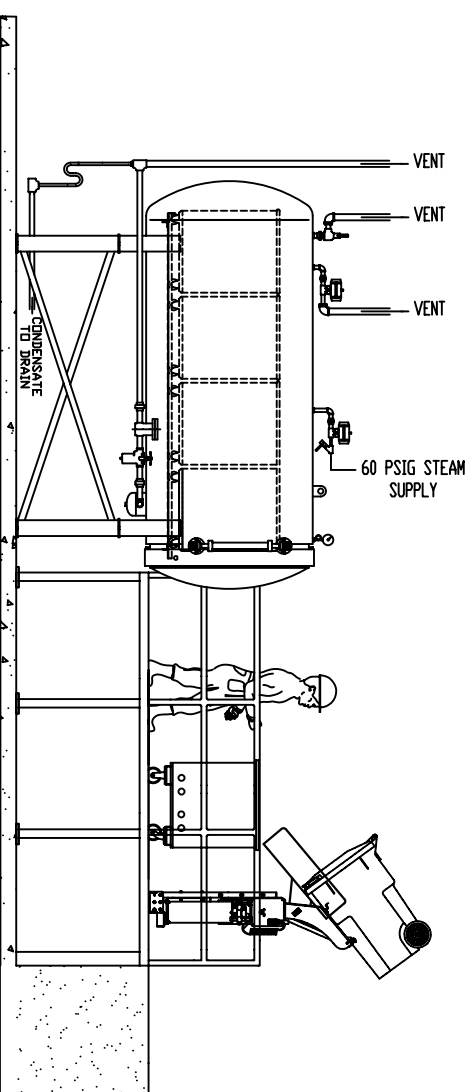
PLAN VIEW



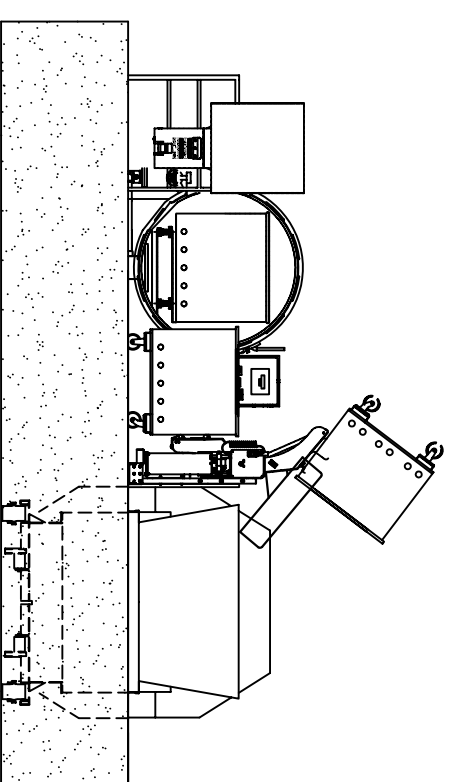
PLAN VIEW

**LEGEND**

- ① MC MEDICAL WASTE STERILIZER MODEL AS510
- ② STEEL DECK-WORK PLATFORM WITH HAND RAILS
- ③ PLC DIGITAL-RECORDER CONTROLLER
- ④ MC STANDARD STERILIZER ALUMINUM CART
- ⑤ MC-HD HYDRAULIC 96 GALLON CART DUMPER
- ⑥ MC-HD HYDRAULIC STERILIZER CART DUMPER
- ⑦ 96 GALLON TRAINABLE CART
- ⑧ MARATHON RJ250SC SELF-CONTAINED TRASH COMPACTOR
- ⑨ MC ODOR CONTROL SYSTEM
- ⑩ STERILIZER DOOR-HYDRAULIC LOCK/UNLOCK
- ⑪ FULL LENGTH CHANNEL GUIDES
- ⑫ BALL VALVE WITH FLEX HOSE & CAM LOCK LIQUID DRAINAGE SYSTEM



SIDE-ELEVATION VIEW



END-ELEVATION VIEW

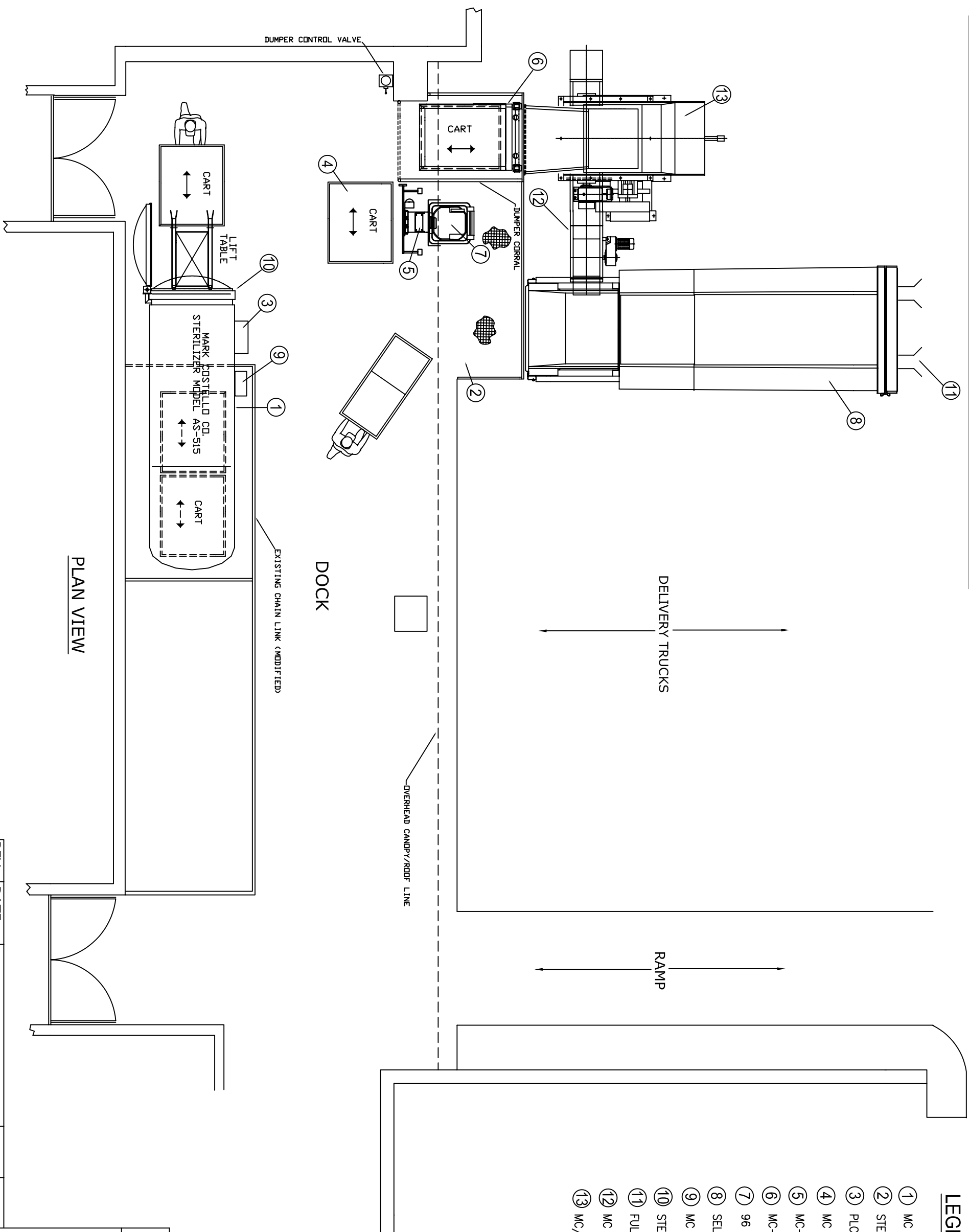
TYPICAL LAYOUT  
MEDICAL WASTE SYSTEM LAYOUT

	DR. MK	CAD.
	CK.	APP.
DATE: 09-09-05		
SCALE: AS SHOWN		
TOL: + - 1/16		
DRAWING NO. 0905-007		
WWW.MARK-COSTELLO.COM		

REV	DATE	DRAWING NO.	DESCRIPTION:

MARK-COSTELLO CO.

\*PRELIMINARY LAYOUT-EQUIPMENT LOCATION SUBJECT TO CHANGE TO FACILITATE SITE CONDITIONS AND EQUIPMENT INTERFACES



**LEGEND**

- ① MC MEDICAL WASTE STERILIZER MODEL AS515
- ② STEEL DECK-WORK PLATFORM WITH HAND RAILS
- ③ PLC DIGITAL-RECORDER CONTROLLER
- ④ MC HIGH VOLUME ALUMINUM STERILIZER CART
- ⑤ MC-HD HYDRAULIC 96 GALLON CART DUMPER
- ⑥ MC-HD HYDRAULIC STERILIZER CART DUMPER
- ⑦ 96 GALLON TRAINABLE RED BAG LOCKABLE CART
- ⑧ SELF-CONTAINED TRASH COMPACTOR (EXISTING)
- ⑨ MC ODOR CONTROL SYSTEM
- ⑩ STERILIZER DOOR-HYDRAULIC LOCK/UNLOCK
- ⑪ FULL LENGTH CHANNEL GUIDES
- ⑫ MC HEAVY DUTY BELT CONVEYOR
- ⑬ MC/VECOPLAN RG52 SHREDDER-GRINDER

**PLAN VIEW**

TYPICAL INSTALLATION  
WASTE HANDLING SYSTEM LAYOUT

	DR. MK	CAD.
	CK.	APP.
DATE: 11-17-05		
SCALE: AS SHOWN		
TOL: + - 1/16		
DRAWING NO. 1105-011		
WWW.MARK-COSTELLO.COM		

REV	DATE	DRAWING NO.	DESCRIPTION:

MARK-COSTELLO CO.