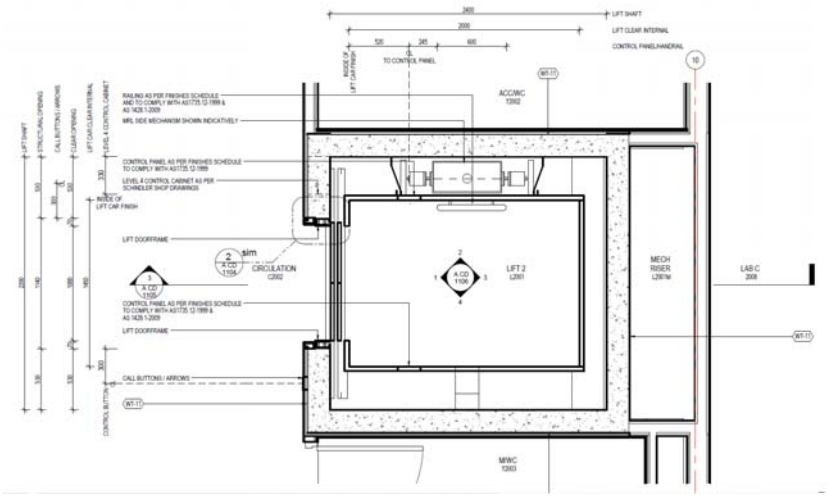
Low EMI Elevator Design saves costly Research Real Estate

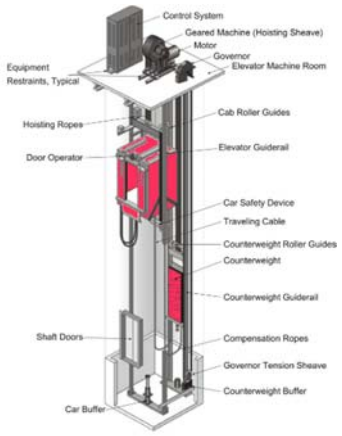
Siting sensitive instruments, whether they are an electron-microscope or other E-Beam tool, research magnets, or other instrument always requires cognizance of the electromagnetic field (EMF) environment and the various types and location of the emission sources. Some of the most difficult EMI concerns to deal with are DC/Geomagnetic or quasi-DC EMI sources (I.e. cars, trucks, subways and trains), and one of the most ubiquitous and difficult to deal with are facility elevators. The EMI footprint from the movement of an elevator through the Earth's magnetic field can "exclude" large areas of a facility from optimal siting of sensitive tools and instruments.

FMS has pioneered an approach with elevators that fundamentally reduces the EMF emission footprint of elevators, so that more siting options for EMI sensitive tools can be available in new and existing/retrofit facilities.

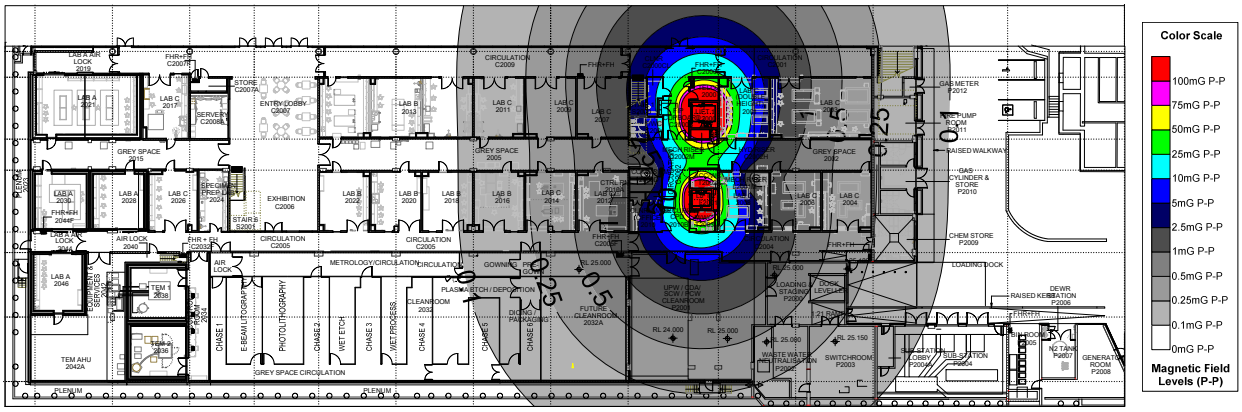
Traction elevator designs typically utilize a steel elevator car and offsetting (usually steel) counterweights.

This type of elevator design causes significant coupling to the geomagnetic field (from each of the two ferromagnetic masses per elevator – elevator car, and counterweight).





Shown below is the EMI footprint from a typical traction elevator



For a recent project where elevator locations were fixed, FMS proposed utilizing non-ferrous counterweights and replacing as much steel in the elevator car with non-magnetic materials.

Lift Finishes Schedule - Passenger & Goods

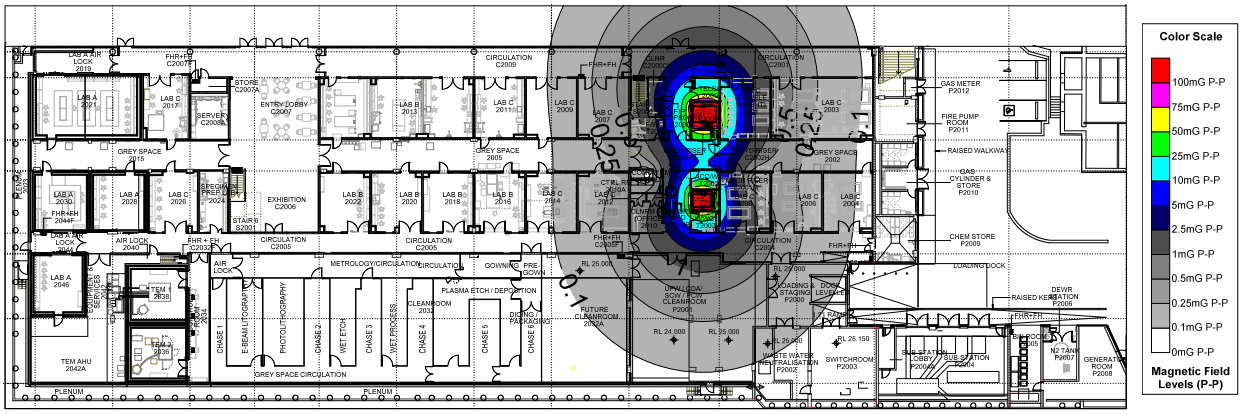
ITEM	DESCRIPTION	CODE
Mirror	Silver Aluminium Framed	M-01
Ceiling	Stainless Steel Brushed G220 (Satin Finish)	SS-02
Handrail	Stainless Steel Brushed G220 (Satin Finish)	SS-02
Lighting	Integrated recessed lighting with diffuser front unit as emergency backup light	
Car door+front	Stainless Steel Brushed G220 (Satin Finish)	SS-02
Floor covering	Aluminium check plate on 30 mm plywood underlay	AL-04
Skirting	Stainless Steel Brushed G220 (Satin Finish)	SS-02
Car control panels	Stainless Steel Brushed G220 (Satin Finish)	SS-02
Passenger Lift		
Side walls	Stainless Steel Brushed G220 (Satin Finish)	SS-02
Front wall	Stainless Steel Brushed G220 (Satin Finish)	SS-02
Rear wall	Stainless Steel Brushed G220 (Satin Finish)	SS-02
Goods Lift		
Side walls	Stainless Steel Brushed G220 (Satin Finish)	SS-02
Bump rails boths sides and rear	Hard wood timber and sealed	T-02

EMI Specification

- Counterweight to be reinforced concrete in lieu of steel
- Electrical reticulation to be enclosed in metal conduits throughout lift shaft, refer to EMI consultants/electrical engineer's specifications for details

As a results of the elevator design modifications, it reduced the 1mG (10nT) EMI footprint by more than 3,000 sq. ft. and the 0.1mG (0.1nT) environment by more than 8,000 sq. ft. Thus, providing more available real estate for sensitive instrument planning.

Shown below is the EMI footprint for the Low EMI Elevator Design.



Field Management Services (FMS) is a unique EMF/EMI solution provider, known for our consultative and collaborative approach, and for providing creative and cost effective mitigation solutions. If you'd like to know more about this project or get more information on how to implement these and other innovated Low EMI Design strategies into your project space…. Contact FMS.