

APPENDIX 'A'

DFL Campus Procedure

DFL Project General Notes & Procedures

DFL Cleanroom Procedures



GENERAL CAMPUS PROCEDURES

Access & Security:

- Contractors must sign-in to receive an access badge at the guardhouse. Valid Photo ID is required.
- Contractors must sign-in at DFL contractor's electronic station or on-site project log-book.
- Badges must be worn visibly at all time, all lost badges must be reported immediately to DFL Commissionaire for notification to the guardhouse.
- Contractors must be escorted at ALL times by either a DFL Commissionaire or cleared DFL personnel responsible for the contractor.
- Normal working hours are Monday to Friday - from 07:00am to 3:30pm. Any hours outside that range are considered as 'after-hours / silent hours' and must require minimum of full 3 working day's notification with the names of all workers to be provided to the DFL project manager.
- Parking spots for contractor and all his sub-contractors to be designated by DFL project manager, all illegal parking will be ticketed by campus security.
- Careful attention must be paid to posted speed limits. RCMP is active on the campus and will issue tickets for speeding.

Site Facilities:

- No large storage available on site, storage of small items must have previous arrangement in place.
- Construction activities must remain within the predefined boundaries unless otherwise permitted in writing.
- Do not block campus roads or parking spots at any time. Moving & operation of all heavy machinery, lifts or cranes for construction or deliveries have to be coordinated and approved by DFL project manager at a minimum of full 2 working days' notice.
- Do not dump any hazardous materials or any kind of contamination in campus drains or man-holes, report any equipment fuel or hydraulic oil leaks immediately to DFL project manager. Any leaks to be immediately contained & cleaned in a proper and legal manners.
- Contractor to be responsible for any damages to campus roads, sidewalks, pavement, lawns, trees, plans, signs, light / camera posts... etc. resulting from all project's work. The contractor shall fix & make good all damaged surfaces. All new & remedial work within construction area should be equal or better condition than it was before starting construction and subject to CSA & campus approvals, all at no additional cost to CSA or campus.

Communication & Photography:

- Phone at the Commissionaire's station or DFL basement is permitted for use.
- No cameras permitted on site; any requirement for pictures will come as a request to Project Manager.

Hot Work Permits:

- Any work that will create smoke, dust or heat must be coordinated at a minimum of three full working days in advance to DFL Project Manager for the issuance of a hot work permit, for each day required.

Workmanship & Ethics:

- Cleanliness is of the utmost importance, it is expected that construction cleanup will be at the end of each day.
- Foul language or improper behavior will not be tolerated.
- Proper building and site protection must be provided at all times.
- Health and Safety practices must be strictly observed on site at all times.

Company Name

Signature and date



DFL PROJECTS GENERAL NOTES, & PROCEDURES

1. All project architectural, structural, civil, mechanical and electrical drawings must be read in conjunction with each other and with all issued contract documents and specifications, except where replaced or changed by directive or corrective addenda or revised drawings and specifications.
2. General contractor to carefully examine & review all construction documents (drawings, specifications & addenda), if any discrepancy occurs between drawings or between drawings & specifications or between English & French drawings & specifications translations, the contractor shall - during tendering - assume the larger / greater / most complete scope with no additional cost to CSA. Any discrepancy shall be referred to the engineer before proceeding with any work.
3. The general contractor shall arrange and pay for all necessary permits, inspections & re-inspections required to be performed by local authorities having jurisdiction including inspection and testing except for building permit to the City of Ottawa which will be applied for by CSA. Turn over to the owner all original approval documentation & certificates.
4. Contractor to be responsible for the provision (supply and installation) of all materials, equipment & services shown on the project drawings & specifications as required for a fully operable system, unless changed or replaced by revised drawings, specifications or addenda.
5. The general contractor shall be responsible for all architectural, structural, mechanical, electrical, plumbing & fire protection work. Be responsible for all floor cutting, core drilling, all chases, openings and patching as may be required by all sub trades who may or may not be under his contract agreements.
6. External contractors may be hired directly by CSA to perform specialty work as part of the overall project scope and within project construction boundaries. Such external work scope, duration & sequence of activities will be identified clearly in project document and will not form as part of general contractor scope or contract. General contractor being responsible for the entire project & boundaries must coordinate and supervise external contractors work, standards and code compliance. GC to review and approve external contractor site specific project health & safety plan (PHSP) before starting any work and assure that their PHSP plan is fully implemented for the full duration of their work.
7. Drawings are not intended to show the details & route of each component to be installed or removed. They are only providing a general overview of the project scope. The contractor shall be responsible to review the site conditions during the tender period and examine the extent of all demolition, removals, modifications & new installations work to include in the tender price all necessary labor and material required for a fully operable system as intended.
8. Immediately after awarding the contract, contractor to check the availability & delivery times of all supplied architectural, structural, mechanical & electrical items. Provide CSA project manager with project schedule, critical path of tasks, complete shop drawings, interference drawings, product & MSDS data on manufactured items, samples, mock-ups and all other information to confirm the contractor's understanding of the design intent documents prior to undertaking those portions of the work. Provide an updated weekly schedule by end of each week in MS Excel or MS project electronic format.
9. All materials and workmanship shall be in accordance with the current codes, by-laws and ordinances of the relevant building authorities where varied by the project spec.

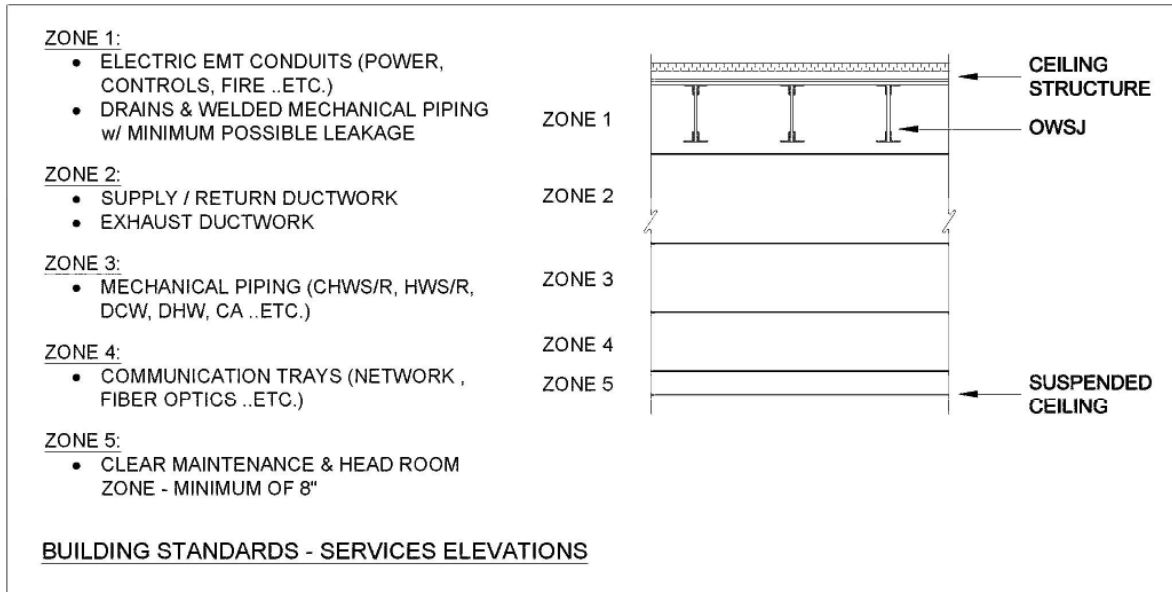
10. All dimensions to be verified on site. Exact location & elevation of equipment is subject to site measurements.
11. Contractor to submit shop drawings for all material, equipment & fixtures to engineer for approval before commencing installation or ordering. All samples to be provided upon CSA request at no additional cost.
12. All supplied materials, fixtures & equipment to be new, free from defects, certified & approved by code. Reuse of any existing parts is not permitted unless approved by CSA.
13. CSA shall be given the option of retaining any removed or demolished components or equipment. Coordinate and hand over to CSA project manager as required. Dispose of any remaining or unwanted equipment or services and remove off site in a legal manner and comply with the environmental protection act, Ontario regulations for waste management program. Certificate of disposal to be handed over to owner after removals are done.
14. Install all equipment in full accordance with the manufacturer specifications & recommendations.
15. All trades should be licensed to perform all work shown on the drawings including removals & demolition in the province of Ontario.
16. Do not damage existing fire separations and fire protections in the project areas. Any damages incurred to existing fire separations and protections shall be restored to an approved condition to meet required rating and codes at no additional costs to the project.
17. Under any circumstances, do not block required access to exits and fire escape routes during the project duration. All existing life safety systems and indicators shall be operational at all times.
18. Smoke eaters & powered exhaust fans vented to outside of building must be used during all brazing / welding / soldering / cutting / grinding activities to minimize contamination & odor to adjacent areas particularly in clean rooms. Provide three full working days' notice to CSA to arrange and issue hot work permits. Contractor to provide their own fire extinguisher, use of DFL fire extinguishers is not permitted. All hot work to be done by 2:30pm max allowing for one hour fire watch, all hot work areas to be inspected by GC site representative at the end of the fire watch period.
19. Contractor to properly protect all interior elements (all architectural finishes, flooring, ceilings, siding, walls, windows, doors, furniture, lab equipment, cranes, electrical systems, HVAC systems, communication & security systems ... etc.) during construction (demolition, modifications & new), be responsible for any damages to existing surfaces resulting from all project's work. The contractor shall make good all damaged surfaces including any paint touch-ups required. Repair all walls, floors & ceilings in core area where mechanical & electrical services pass through. All existing & new finishes within construction area should be equal or better condition than it was before starting construction, all at no additional cost to CSA.
20. Contractor to protect building HVAC system during construction from dust, smoke and any other form of contaminations. Apply new clean filter sheets on all supply air openings and diffusers. Block all return air openings & grilles with new clean plastic sheets. Carefully remove all protective filters & plastic sheets after completion of all project activities and cleaning. Use of duct tape, packaging tape, gorilla tape & tuck tape for protective materials installation is not permitted as it will damage the finishes, use of nylon cable ties (tie wraps) or painter tape is preferred.
21. Contractor is responsible to properly protect all exterior building and campus elements (landscape, pavers, sidewalks, campus roads, lawn, trees, plants, courtyards, signs, camera & light posts, building envelope & siding, windows, doors, roofing, gas lines, HVAC equipment ...etc.) from any damages resulting for any interior or exterior work (demolition, modifications & new). Upon noticing of any damages, CSA will engage external consultant / specialist (at GC cost) to assess damages, specify the repair standards, method & procedure if required and inspect the remedial work quality done by GC for approval, all at no additional cost to CSA.

22. Exact tarping limits and access routes to be determined on site in coordination with CSA project manager.
- All tarps to be **new** heavy duty polyethylene, water / mildew / tear resistant, **white**, tight sealed from deck to floor and from wall to wall, contractor to provide access zippers or doors as required by CSA, use metal studs as framing supports, no wood materials to be used in tarps construction unless approved by CSA.
 - Approved methods to attach studs / tarps to building as follow:
 - On floors: heavy duty commercial double sided tape to secure metal studs to floors, use of screws or tapcons are not permitted.
 - On drywalls / masonry / metal siding walls: duct or tuck tape is not allowed directly on building finishes as it will damage them when removed; apply masking paint green tape first and then duct / tuck tape on top of it. Studs can be screwed to drywall / masonry walls giving that all holes will be patched & painted (whole wall / area to be painted, small / local paint patches are not permitted).
 - Tarps could be hanged off building steel structural using high strength cable ties, provide heavy gauge unistruts as needed for cross runs or to distribute tarps load.
 - Hanging tarps from building services (ductwork, conduits, pipes, supports, hangers ... etc.) is not permitted.
 - Contractor is responsible for cleaning, patching, repairing & painting all damaged surfaces & tape marks after removing tarps. Walls and ceilings to be painted in full, no local paint patches are permitted.
23. Provide floor protection to entire project areas before any work starts as follow:
- Floor to be wiped clean from any debris or dust particles.
 - Provide min. 1/8" foam layer directly on all flooring.
 - Provide hard sheets on top of foam layer, all sheets seams to be duct-taped to prevent debris / dust from getting trapped under the protection sheets. Use of OSB sheets is not permitted.
24. Provide furniture and equipment protection as follow:
- Office / lab furniture and equipment: to be completely covered and wrapped with **new** heavy duty **clear** plastic roll sheets.
 - Sensitive lab testing equipment: to be completely covered and wrapped with **new** heavy duty **clear** plastic roll sheets, **clean** scaffolding to be erected on top of all lab equipment to protect from possible falling objects.
25. Contractor to provide bilingual construction, access & safety signage, signs to be posted on all project fences, boundaries & entrances at the start of project and before commencing any work.
26. Access to the site for material, work forces and for waste removal is to be coordinated with CSA project manager, use only elevators designated by CSA and protect them from damage.
27. When testing activities are not underway, large or small loading docks can be used to move materials in and out of the building from 7:00 am to 8:00 am without CSA needing to provide notice to building staff. If access is required after this time or for longer periods, three full working days' notice must be provided to CSA project manager to confirm availability and arrange for proper notices.
28. Contractor to provide, clean & maintain his own portable sanitary facilities, building washrooms shall not be used for construction unless approved by CSA project manager.
29. Only designated areas are to be used for lunch and break time. All other areas are off limits.
30. Contractor to respect all building floor loading limitations, coordinate and confirm with CSA project manager prior to bring in any heavy tools, equipment and lifts.
31. Only the use of clean electrical lifts is permitted anywhere inside the building, use of propane / diesel / gas powered lifts are not permitted except when used outside the building. All exhausts to be aimed opposite to and away as much as possible from building envelope, windows, doors, entrances & HVAC intakes.

32. General contractor shall be responsible to keep the owner's access areas and corridors clean at all times.
- Clean and remove all demolition and construction waste from project site on daily basis and upon completion of project.
 - Transport all loose materials in / out of building in clean covered containers.
 - Do not use CSA waste containers. An area will be designated for locating contractor waste bins upon request.
 - Contractor to provide all cleaning equipment & supplies, use of building cleaning equipment or supplies are not permitted.
33. Do not subject any part of the building to any noise, dust or any other unacceptable environmental conditions during the course of the project. Any noisy / dusty / smelly activities shall be done after regular working hours or weekends, coordinate with CSA project manager with a minimum notice of three full working days.
34. All penetrations through walls and floors shall be saw-cut or core drilled. Jack hammering is not permitted. All walls, floors & ceilings penetrations to be sealed by contractor in accordance with applicable fire codes & the engineer's requirements. Use of powder actuated tools using explosives is prohibited.
35. Parts noted to be supplied by CSA shall be fully installed & supported by contractor at no additional cost.
36. Projects may take place in a cleanroom environment, mandating special measures be taken to reduce laboratory disruption. Class 8 (100,000) cleanroom standards are to be met for the area surrounding construction at all times and are subject to verification. Refer to clean room procedures sheet.
37. All GC & sub-trades workers, inspectors, operators ... etc. have to be escorted at all times while in building and on campus.
- CSA will provide security commissionaires to escort personnel during normal working hours, any escort request for additional work outside normal hours will be subject to management & availability approvals and will be back-charged to GC.
 - Prior to project start, GC to provide a full list –as much as possible- of all personnel working on the project as well as engineers, suppliers, operators & inspectors to issue necessary forms for campus and CSA building access.
 - Name, company name & nationality is required for each individual, non-Canadian will require a copy of passport, allow for two to three weeks for security check.
 - Visit Clearance Request (VCR) form will be issued by CSA security to campus security with all GC provided names prior to project start date, VCR form will be updated and resend to Campus security ONLY ONCE a week on Fridays' noon for next week access. Requests for additional names can be provided by GC from Monday morning until Thursday @ 1:00pm on every week for next week access, any names received after Thursday @ 1:00pm cannot be added for the next week and will be considered for the following week.
 - Individuals who are not on VCR list will be denied access by campus security. No expiations and no emergency requests will be accepted.
 - Provide at least four full working days' notice to CSA project manager for any after hours or weekend work requests for CSA management & campus approvals.
 - Provide two full working days' notice for any delivery of materials or rental equipment delivery or pick-up (only name of the company and type of delivery is required – name of driver is not required) to issue the proper forms to campus security. General contractor must be on site to inspect & receive the shipment. If the delivery pertains to lifting equipment, one of the qualified contractors assigned to use the equipment must inspect and receive the lift from the rental company. No last minute request will be accepted.
 - Notify CSA immediately of any change in schedule that affects the need for security escorts.
38. General contractor representative has to be present on site at all times and accompany all sub-trade workers; trades & sub-trades are not allowed to be on site or to work without the presence of approved designated GC representative – no exceptions.

39. All personnel (contractors, admin, inspectors, operators... except material drivers) must attend one-time mandatory DFL security briefing (20~30 minutes) before starting any work on site, adhere to the information presented at all times. Security briefing will take place on first day of the project and then on the following Mondays' morning only for added names upon GC request, no individual or emergency briefings requests will be allowed. Any person who did not attend this briefing will not be allowed to work on site – no exceptions.
40. Improper / unclean / ripped clothing, foul language, improper behavior, smoking in undesignated areas including e-cigarettes will not be tolerated and worker will be escorted off campus immediately – no exceptions.
41. CSA, at their discretion, may request a worker to leave the site if there is demonstrated impaired mental or physical capability affecting his/her work performance and possibly putting others at risk due to consumption of alcohol, cannabis or illegal substances.
42. DFL is a high profile occupied building, use of music or radio on site is not permitted at all times.
43. Any form of photos & video recordings (cameras, camcorder, cell phones, tablets, laptops .. etc.) are totally prohibited by any personnel at all times inside / outside DFL buildings or anywhere on campus – no exceptions. GC to submit request for project specific pictures to DFL project manager, photos will be taken by authorized DFL personnel only and sent to GC after security screening, allow for full two working days for screening and approval process. CSA reserves the right to screen & limit photos as permitted.
44. CSA is committed to ensuring a healthy and safe environment for its employees, contractors and visitors and will align itself with contractors who share in this vision.
- The requirements outlined below are provided as reference and are there to assist the contracting company who performs the work and accepts this commitment completely:
 - Ontario occupational health and safety act:
<http://www.e-laws.gov.on.ca>
 - Infrastructure health and safety association “guide to developing health and safety policies and programs in construction” a comprehensive guide geared to mid- to large-sized general contractors for developing and implementing an effective health and safety program:
<http://www.ihsa.ca>
 - Infrastructure health and safety association “construction health and safety manual”. guidance on hazard controls for Ontario contractors:
<http://www.ihsa.ca>
 - The general contractor will be required to prepare and submit to the CSA project manager a full site specific project health and safety plan, herein called PHSP, prior to the commencement of any works and within 2 weeks of contract award. Plan to be reviewed & approved by CSA before starting any work.
 - The general contractor shall provide CSA project manager a copy of all notices or other written correspondence provided to or received by the Ontario Ministry of Labor (OML) for the duration of the contract.
 - The general contractor shall fully implement the PHSP for the full duration of the contract.
 - A copy of all applicable training certificates must be provided prior to commencing any work. Certificates must show exact company name and address that provided the training. CSA reserves the right to request the course outline from the company that provided the training. If the proof of training does not demonstrate the worker as being competent operators, further training may be requested by the CSA prior to commencing any work at no additional cost.
45. GC and all his sub-trades are responsible to provide all ladders, scaffolding, lifts, cranes and all other equipment & tools required for project scope including installing & removing tarps & protection materials. Use of building tools, equipment, trollies, forklifts, skids, ladders, lifts, cranes ... etc. are not permitted.

46. All trades to follow building service elevations standard as follow:



47. General contractor and all trades to strictly follow campus, DFL cleanrooms & CSA/DFL procedures at all times. GC is responsible to acknowledge & distribute all procedures to all his workers & sub-trades.

48. Abbreviations:

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| • CSA | Canadian Space Agency |
| • CSA* | Canadian Standards Association (for codes, certifications & standards) |
| • DFL | David Florida Laboratory (CSA testing & integration lab in Ottawa) |
| • S&F | CSA Security & Facilities |
| • B-Ops | DFL Building operations group |
| • EQF | DFL Environmental Qualification Facility (Thermal & structural testing group) |
| • RFQF | DFL Radio Frequency Qualification Facility |
| • TSS | DFL Technical Support Services (Shipping & receiving group) |
| • CRC | Communications Research Canada (Shirley's Bay campus custodian) |
| • GC | General Contractor |
| • OSB | Oriented Strand Board |
| • PHSP | Project Health and Safety plan (Site specific plan) |
| • MSDS | Material Safety Data Sheet |
| • TV# | Thermal Vacuum Chamber – Number # |
| • TCU | Thermal Conditioning Unit |
| • LN2 | Liquid Nitrogen |
| • GN2 | Gaseous Nitrogen |
| • CMP | Contamination Monitoring Plate |
| • CDACS | Combined Data Acquisition & Control System |
| • TRAPS | Thermal Response And Power System |

Company Name

Signature and date



DFL CLEANROOM PROCEDURES

Cleanroom Regulations and Clothing Requirements

- Clean Rooms are all areas within the air showered rooms, except the loading dock(s) and change rooms.
- All other areas are not considered as "Clean Rooms".
- When working within the clean room(s), all personnel shall:
 - Wear a clean room coat (cloth or disposable), completely fastened.
 - Wear a disposable hat / beard cap ensuring all hair is covered by the cap.
 - Ensure footwear is clean.
- Attire not approved in clean rooms include shorts, skirts, dresses, open shoes (sandals, flip-flops ...), high heel shoes are not preferred for safety and protection of floor finishes.

Clean Room Entry & Exit Procedures

- Personnel must remove all weather protection clothing (coats, boots etc.) prior to entering any clean room.
- Shoes must be cleaned using the shoe cleaner.
NOTE: Shoe cleaners are not intended for use on heavily soiled footwear
- All personnel must use the air shower prior to entering the change room.
- Personnel must walk on the sticky mats prior to entering the clean room.
- Exit from any clean room will be either through the air shower (which does not operate on exit), or via direct exit door.

Working Within the Clean Rooms

- Any drilling, cutting, grinding, filing or other jobs creating swarf or debris must be done with a HEPA vacuum running at all times to collect all debris generated.
- All equipment, materials, lifts or cranes brought into the clean room from the outside must be thoroughly cleaned prior to entry and clear of any dust, mud or loose particles.

Clean Room Containers

- Containers must be constructed from metal, plastic or smoothly finished wood, and must be sealed with urethane or oil based paint.
- Insulation, either fixed or removable must be sealed to prevent shedding.
- Containers brought into the clean room from the outside must be thoroughly cleaned prior to entry and completely wrapped in new clean plastic or cling film.
- NO cardboard boxes or bare wood are permitted in the clean rooms.
- Interior loading dock doors must not be opened while the exterior loading dock door is open.

PROHIBITED CLEAN ROOM PRACTICES

- Wearing clean room clothing outside designated clean rooms and controlled areas.
- Wearing street clothes in designated clean rooms and controlled areas.
- Grooming, eating, drinking or smoking within any designated clean room or controlled area.
- Painting or leaving chemical containers and contaminants open or exposed in any designated clean room or controlled area.

- No radios or music is allowed in clean rooms and controlled areas.
- Cameras and photos are totally prohibited in clean rooms and controlled areas.
- Failing to clean job sites at the completion of a job or at the end of a shift.
- ADMITTING UNAUTHORIZED PERSONNEL INTO THE DFL SECURED AREAS WITHOUT AUTHORIZATION.

Company Name

Signature and date