Part 1 LEED® Certification and Total Cost of Ownership

1.1 Summary

.1 McGill requires projects to achieve prescriptive levels of environmental performance according to project size and scope. New construction and major renovations are required to register and achieve certification using the Leadership in Energy and Environmental Design (LEED®) v4 green building certification rating system. All projects are encouraged to pursue aggressive levels of energy efficiency and sustainable design using recognized performance standards as design minimums. Minimum performance standards for McGill will be as follow:

.1 **New Construction and Major Renovations**

All new buildings or full-gut renovation projects (defined as a renovation of more than 50% of the building's net floor area) must achieve at least a LEED® v4 Gold certification. All projects will produce an assessment of the maximum number of LEED® credits achievable and the costs to the project for achieving these objectives.

Projects must also submit Total Cost of Ownership analyses at each step of the design process to inform the project's design and to justify design decisions (see section 1.2.7 below for details).

.2 **Major Interior Fit-Outs**

All building interior fit-outs of more than 500 m² and modifying two, or more, building systems (electrical, mechanical, plumbing and/or building envelope) must achieve at minimum a LEED® v4 ID+C Gold equivalence. Modification of electrical systems is defined as the replacement of existing, and/or the installation of new, lighting fixtures, energy production systems and/or energy management systems. Modification of plumbing systems is defined as the replacement of existing plumbing fixtures and/or the installation of new plumbing fixtures. Modification of mechanical systems is defined as the replacement of existing mechanical equipment and/or the installation of new mechanical equipment; ductwork is not included in the definition. All projects will include a LEED® ID+C Gold certification feasibility section in the initial design submission.

Equivalence is defined as the pursuit of LEED® v4 ID+C Gold certification without officially submitting the project to the GBCI for certification. As such, projects will not have a third-party LEED agent, however, McGill's Sustainability Construction Officer (SCO) will accompany project teams throughout the design and construction of the project to ensure compliance with the LEED® v4 ID+C standard. The SCO will work with the project team to identify which LEED® v4 ID+C credits will be targeted by the project to ensure a minimum of 60 points is achieved. Project teams are responsible for preparing and submitting to the SCO all documentation demonstrating conformity to the LEED® v4 ID+C prerequisites and targeted credit requirements. To minimize any impacts on the project schedule and budget, project teams must contact the SCO as soon as a project falls within the aforementioned fit-out threshold for LEED® v4 ID+C compliance.

Projects must also submit Total Cost of Ownership analyses at each step of the design process to inform the project's design and to justify design decisions (see section 1.3.10 below for details).

.3 **Minor Renovations and Improvements**

For all renovation projects below 500 m^2, or projects with minor modifications to only one building system (less than 50% of one system is modified), there are no specific LEED® design, construction, or documentation requirements above and beyond the normal requirements outlined in each section of the McGill Design Standards.

.4 **Major Building System Upgrades**

For all system upgrades with a change of more than 50% of a building system (electrical, mechanical, plumbing, roof, and/or vertical building envelope), Total Cost of Ownership (TCO) analyses are required, the details of which are outlined in sections 1.4 and 1.5 below. Additionally, for projects involving refrigerants, compliance with the LEED® v4 ID+C Enhanced Refrigerant Management credit must be demonstrated. There are no other LEED® specific design, construction, or documentation requirements above and beyond the normal requirements outlined in each section of the McGill Design Standards.

1.2 New Construction, Major Renovations

For all new buildings or full-gut renovation projects (defined as a renovation of more than 50% of the building's net floor area):

.1 LEED Consultant

Once the scope of the project has been established, the Project Manager is to contact McGill's Sustainability Construction Officer (SCO) to determine if the project must mandate an external LEED consultant or if the SCO will act as the LEED consultant on the project.

.2 Integrative Process

In order to assist project teams in the vetting of sustainable goals and objectives, McGill has identified integrated design requirements for projects based on their scope of work. Beginning in pre-design and continuing throughout the design phases, identify and use opportunities to achieve synergies across disciplines and building systems. The first meetings of all projects should clarify the design objectives with respect to sustainable design, in conjunction with McGill's Project Manager and the LEED consultant.

.1 Once the LEED consultant has been brought into the project, perform at minimum one integrated design charrette as early in schematic design as possible. The SCO will determine the number of design charrettes appropriate for the project based on the project's complexity and the ability of the project team to address all relevant topics within the time allotted for the first design charrette. The SCO is responsible for organizing and heading the design charrettes. The charrette must include identification and tracking of project goals and high-level analyses of the Total Cost of Ownership impacts of potential design options. Charrettes should include representation of major stakeholders including occupants and operations staff.

.2 Following the initial design charrette, use the analyses described below to inform the owner's project requirements (OPR), basis of design (BOD), design documents, and construction documents:

.1 Preliminary Energy Analysis

Before design of the building geometry begins, a building massing ("simple box") energy analysis can be used to evaluate potential energy and load reduction strategies.

.1 Site conditions

Consider the site's surroundings, integration of landscape components and strategies to minimize lighting needs.

.2 Massing and orientation

Consider footprint, shape, height, and orientation.

.3 Building envelope performance

Consider options for the following aspects, and their effects on energy loads:

.1 Solar heat gain coefficients and overall U-value of glazing systems

.2 R-value of walls, roofs, and conditioned below-grade structures

.3 Orientation

.4 Percentage of exterior glazing (e.g., 30%, 50%, and 70%)

.4 Lighting levels

Consider at least two options for reasonable reductions in lighting power density, including one aimed at a significant reduction from ASHRAE standards.

.5 Thermal comfort ranges

Consider options for expanding the thermal comfort range.

.6 Plug and process load needs

Consider at least two options for reasonable reductions in plug load density, including one aimed at a significant reduction from ASHRAE standards.

.7 Programmatic and operational parameters

Consider options aimed at reducing building size.

.2 Water-Related Systems

.1 Perform a preliminary water budget analysis before the completion of schematic design that explores how to reduce potable water loads. Assess and estimate the project's potential non-potable water supply sources and water demand volumes, including the following:

.1 Indoor water demand.

.2 Outdoor water demand.

.3 Process, services, and equipment water demand, as applicable

.4 Alternative supply sources for non-potable water.

.3 LEED Certification Assessment

Following the design charrette, the SCO and external LEED consultant (if one has been mandated) will identify the LEED® v4 credits to be pursued by the project.

.4 Commissioning

Projects must ensure a commissioning agent has been mandated for the project before the completion of schematic design. Refer to section 01 91 13 for project commissioning requirements.

.5 Refrigerants

Projects should strive to eliminate the use refrigerants whenever possible or use only refrigerants (naturally occurring or synthetic) that have an ozone depletion potential (ODP) of zero and a global warming potential (GWP) of less than 50. For projects unable to incorporate refrigerants that meet the aforementioned levels of performance, the mechanical engineer must complete and submit the refrigerant impact calculation and achieve compliance as per the LEED® v4 ID+C Enhanced Refrigerant Management credit requirements.

.6 Indoor Environmental Quality

- .1 Daylighting and Quality Views

  Projects are to maximize daylighting while controlling for glare. As much as possible, regularly occupied spaces should be located near glazing with unobstructed views to the exterior.
- .2 Biophilic Design

  Projects integrate and encourage occupant access to nature within the building and project site (external to the building) through the following:
  - .1 Direct connection to nature through at least two of the below: Plants; Water; Light; Nature views; Indirect connection to nature through use of natural materials, patterns, colors or images.
  - .2 Space layout, addressing placement of natural elements along common circulation routes, shared seating areas and rooms (e.g., conference rooms, common spaces) and workstations (as applicable) to enhance occupant exposure.
- .3 Restorative Spaces

  Projects designate indoor and/or outdoor space available to all regular project occupants to support restorative practices. This may be a single space or several spaces that meets the following requirements:
  - .1 Designated exclusively for contemplation, relaxation and restoration (not to be used for work).
  - .2 Is a minimum of 7 m^2 plus 0.1 m^2 per regular project occupant, up to a maximum of 74 m^2.
  - .3 Encourages contemplation, relaxation, and restoration, in consideration of the design criteria below:
    - .1 Accessible design.
    - .2 Lighting (e.g., dimmable light levels).
    - .3 Intrusive noise and sound masking (e.g., water feature, natural sounds).
    - .4 Thermal comfort.
    - .5 Seating arrangements that accommodate a range of user preferences and activities (e.g., movable lightweight chairs, -cushions, mats).
    - .6 Nature incorporation.

.7 Calming colors, textures, and forms.

.8 Visual privacy.

.9 Education materials or resources are available to occupants explaining the purpose of the space and how to make use of it.

.4 Acoustic performance

.1 Projects are to meet, at minimum, the sound transmission class ratings and reverberation time requirements listed section 09 84 10 – Acoustic Treatment.

.2 HVAC systems must achieve maximum background noise levels in accordance with 2011 ASHRAE Handbook, HVAC Applications, Chapter 48, Table 1 or AHRI Standard 885-2008, Table 15. Additionally, HVAC are to comply with design criteria for noise levels resulting from the sound transmission paths listed in ASHRAE 2011 Applications Handbook, Table 6.

.7 Airtightness

New buildings and projects modifying building thermal envelope composition (for definition see section 01 83 16) for more than 50% of the thermal envelope area, are to test for and achieve envelope airtightness levels as specified in 01 83 16 Part 2.

.8 Total Cost of Ownership Analysis

.1 Summary

In order to assist project teams assess the Total Cost of Ownership (TCO) implications that decisions have throughout the course of design, McGill has developed a Total Cost of Ownership template to compare construction alternatives. It is best practice to include building operations staff in all TCO and value engineering reviews.

.2 With the assistance of the SCO and/or a representative from the Utilities and Energy Management department, the engineer and/or architect is/are to perform the required TCO analyses according to McGill's Total Cost of Ownership Calculation for Facilities Asset Management Framework (see table 1.5 below for details). The scope of TCO will vary depending on the project, but will typically include envelope, HVAC, electrical, and other building systems. The Project Manager and/or SCO and/or a representative from the Utilities and Energy Management department will determine together the scope of TCO analyses required. Requirements include:

.1 Planning/conceptual design: complete initial TCO templates with supporting narratives for optional design elements with major budget implications;

.2 Schematic design: complete TCO templates presenting options for major energy-consuming systems;

.3 Value engineering (any phase): complete TCO templates presenting impacts beyond initial capital outlay.

.9 Whole-building Lifecycle Analysis

.1 All projects that involve the construction of new buildings and/or extensions to existing buildings, must conduct a whole-building lifecycle analysis (WBLCA) of, at minimum, the building's structure and thermal envelope. McGill's SCO will create a baseline WBLCA at LOD 200 and iteratively update the WBLCA during the design phase to reflect significant changes in the quantity and type of materials, as the design evolves. A final WBLCA will be conducted by the SCO at substantial completion, during the construction phase. At LOD 200, the structural engineer and architect must provide at least two alternatives for each building envelope assembly and structural system in order for the SCO to establish the baseline design and a minimum of one alternative for a comparative analysis of environmental impacts. The results of the WBLCA will be used to inform the final project design.

1.3 Major Interior Fit-Outs

For all building interior fit-outs of more than 500 m² and touching at minimum two building systems (electrical, mechanical, plumbing and/or building envelope):

.1 Contact McGill's Sustainability Construction Officer (SCO) to confirm if the project is indeed required to pursue LEED® v4 ID+C Gold equivalency. The SCO will act as the LEED consultant on the project.

.2 Integrated Design Charrette

Once the SCO has been brought into the project, perform at minimum one integrated design charrette as early in schematic design as possible. The SCO will determine the number of design charrettes appropriate for the project based on the project's complexity and the ability of the project team to address all relevant topics within the time allotted for the first design charrette. The SCO is responsible for organizing and heading the design charrettes. The charrette must include identification and tracking of project goals and high level analyses of the Total Cost of Ownership impacts of potential design options. Charrettes should include representation of major stakeholders including occupants and operations staff. Use the analyses described below to inform the owner's project requirements (OPR), basis of design (BOD), design documents, and construction documents:

.1 Preliminary Energy Analysis

.1 Perform a preliminary energy analysis to evaluate potential energy and load reduction strategies:

.1 <u>Building envelope performance</u>

Consider options for the following aspects, and their effects on energy loads:

.1 Solar heat gain coefficients and overall U-value of glazing systems

.2 R-value of walls, roofs, and conditioned below-grade structures

.3 Percentage of exterior glazing (e.g., 30%, 50%, and 70%)

.2 <u>Lighting levels</u>

Consider at least two options for reasonable reductions in lighting power density, including one aimed at a significant reduction from ASHRAE standards.

.3 <u>Thermal comfort ranges</u>

Consider options for expanding the thermal comfort range.

.4 <u>Plug and process load needs</u>

Consider at least two options for reasonable reductions in plug load density, including one aimed at a significant reduction from ASHRAE standards.

.5 <u>Programmatic and operational parameters</u>

Consider options aimed at reducing project scope and/or size.

.2 Implementation

.1 Demonstrate how the analysis informed the design of the following systems, as applicable:

.1 Building envelope and façade conditions;

.2 Elimination and/or significant downsizing of building systems (e.g., HVAC, lighting, controls, exterior materials, interior finishes, functional program elements).

.2 Water-Related Systems

.1 Perform a preliminary water budget analysis before the completion of schematic design that explores how to reduce potable water loads, including the following:

.1 Indoor water demand.

.2 Outdoor water demand, as applicable.

.3 Process, services, and equipment water demand, as applicable.

.2 Implementation

.1 Demonstrate how the analysis informed the design of the following systems, as applicable:

.1 Plumbing

.2 Rainwater quantity and quality management

.3 Landscaping, irrigation, and site elements

.4 Roofing systems

.5 Others

.3 LEED Certification Assessment

Following the design charrette, the SCO will identify the LEED® v4 ID+C credits for which the project must achieve equivalency.

The project manager is responsible for determining and informing the SCO of the additional cost if the project were to pursue official LEED® v4 ID+C certification.

.4 Refrigerants

Projects should strive to eliminate the use of refrigerants whenever possible or use only refrigerants (naturally occurring or synthetic) that have an ozone depletion potential (ODP) of zero and a global warming potential (GWP) of less than 50. For projects unable to incorporate refrigerants that meet the aforementioned levels of performance, the mechanical engineer must complete and submit the refrigerant impact calculation and achieve compliance as per the LEED® v4 ID+C Enhanced Refrigerant Management credit requirements.

.5 Material selection

.1 Projects must incorporate at minimum 20 permanently installed products with Type III third-party verified Environmental Product Declarations respecting the requirements of the LEED® v4 ID+C Building Product Disclosure and Optimization – Environmental

Product Declarations credit. Products must be sourced from at minimum 5 different manufacturers.

.2 Projects must incorporate at minimum 20 permanently installed products with manufacturer inventory and/or Cradle to Cradle (C2C) certification and/or Health Product Declarations (HPD) and/or Declare labeling, all respecting the requirements of the LEED® v4 ID+C Building Product Disclosure and Optimization – Material Ingredients credit. Products must be sourced from at minimum 5 different manufacturers.

.3 At least 50% of non-structural materials shall be reusable or recyclable, as defined by the Federal Trade Commission Guide for Use of Environmental Marketing Claims, 260.12.

.4 All flooring, ceilings, walls, thermal insulation, acoustic insulation, furniture, as well as all paints, coatings, adhesives, and sealants applied on site, must meet the VOC thresholds of the LEED® v4 ID+C Low-Emitting Materials credit.

.6 Commissioning

Projects touching mechanical systems must ensure a commissioning agent has been mandated for the project before the completion of schematic design. Refer to section 01 91 13 for project commissioning requirements.

.7 Design for Flexibility

.1 Wherever possible, install accessible systems (e.g., raised floor systems or suspended ceiling tiles) for at least 50% of the project floor area to allow for flexible use of space and access to systems not entangled with other building systems.

.2 At least 50% of interior non-structural walls, ceilings, and floors shall be designed to be movable or demountable.

.8 Waste management during occupancy

.1 Projects must include a waste management plan for occupancy, demonstrating where and how waste will be sorted (i.e., location of sorting stations, identification of primary waste streams and location of short-term waste collection and storage, as applicable).

.9 Indoor Environmental Quality

.1 Daylighting and Quality Views

Projects are to maximize daylighting while controlling for glare. As much as possible, regularly occupied spaces should be located near glazing with unobstructed views to the exterior.

.2 Biophilic Design

Projects integrate and encourage occupant access to nature within the building and project site (external to the building) through the following:

.1 Direct connection to nature through at least two of the below: Plants; Water; Light; Nature views; Indirect connection to nature through use of natural materials, patterns, colors or images.

.2 Space layout, addressing placement of natural elements along common circulation routes, shared seating areas and rooms (e.g., conference rooms, common spaces) and workstations (as applicable) to enhance occupant exposure.

.3 Acoustic performance

.1 Projects are to meet, at minimum, the sound transmission class ratings and reverberation time requirements listed section 09 84 10 – Acoustic Treatment.

.2 HVAC systems must achieve maximum background noise levels in accordance with 2011 ASHRAE Handbook, HVAC Applications, Chapter 48, Table 1 or AHRI Standard 885-2008, Table 15. Additionally, HVAC are to comply with design criteria for noise levels resulting from the sound transmission paths listed in ASHRAE 2011 Applications Handbook, Table 6.

.10 Total Cost of Ownership Analysis

.1 Summary

In order to assist project teams assess the Total Cost of Ownership (TCO) implications that decisions have throughout the course of design, McGill has developed a Total Cost of Ownership template to compare construction alternatives. It is best practice to include building operations staff in all TCO and value engineering review.

.2 With the assistance of the SCO and/or a representative from the Utilities and Energy Management department, the engineer and/or architect is/are to perform the required TCO analyses according to McGill's Total Cost of Ownership Calculation for Facilities Asset Management Framework (see table 1.5 below for details). The scope of TCO will vary depending on project, but will typically include envelope, HVAC, electrical, and many other building systems. The Project Manager and/or SCO and/or a representative from the Utilities and Energy Management department will determine the scope of TCO analyses required. Requirements include:

.1 Planning/conceptual design: initial TCO templates with supporting narratives for optional design elements with major budget implications;

.2 Schematic design: TCO templates presenting options for major energy-consuming systems;

.3 Value engineering (any phase): TCO templates presenting impacts beyond initial capital outlay.

1.4 Major Building System Upgrades

For all system upgrades with a change of more than 50% of a system (electrical, mechanical, plumbing, roof, and/or vertical building envelope):

.1 Preliminary Energy Analysis

.1 Perform a preliminary energy analysis to evaluate potential energy and load reduction strategies:

.1 Building envelope performance

Consider options for the following aspects, and their effects on energy loads:

.1 Solar heat gain coefficients and overall U-value of glazing systems

.2 R-value of walls, roofs, and conditioned below-grade structures

.3 Percentage of exterior glazing (e.g., 30%, 50%, and 70%)

.2 Lighting levels

Consider at least two options for reasonable reductions in lighting power density, including one aimed at a significant reduction from ASHRAE standards.

.3 Thermal comfort ranges

Consider options for expanding the thermal comfort range.

.4 Plug and process load needs

Consider at least two options for reasonable reductions in plug load density, including one aimed at a significant reduction from ASHRAE standards.

.5 Programmatic and operational parameters

Consider options aimed at reducing project scope and/or size.

.6 Implementation

.1 Demonstrate how the analysis informed the design of the following systems, as applicable:

.1 Building envelope and façade conditions;

.2 Elimination and/or significant downsizing of building systems (e.g., HVAC, lighting, controls, exterior materials, interior finishes, functional program elements).

.2 Water-Related Systems

.1 Perform a preliminary water budget analysis before the completion of schematic design that explores how to reduce potable water loads, including the following:

.1 Indoor water demand.

.2 Outdoor water demand, as applicable.

.3 Process, services, and equipment water demand, as applicable.

.2 Implementation

.1 Demonstrate how the analysis informed the design of the following systems, as applicable:

.1 Plumbing

.2 Rainwater quantity and quality management

.3 Landscaping, irrigation, and site elements

.4 Roofing systems

.5 Others

.3 Energy Modelling and Utility Metering

Refer to section 01 86 00 for energy modelling and utility metering requirements.

.4 Refrigerants

Projects should strive to eliminate the use of refrigerants whenever possible or use only refrigerants (naturally occurring or synthetic) that have an ozone depletion potential (ODP) of zero and a global warming potential (GWP) of less than 50. For projects unable to incorporate refrigerants that meet the aforementioned levels of performance, the mechanical engineer must complete and submit the refrigerant impact calculation and achieve compliance as per the LEED® v4 ID+C Enhanced Refrigerant Management credit requirements.

.5 Airtightness

New buildings and projects modifying building thermal envelope composition (for definition see section 01 83 16) for more than 50% of the thermal envelope area, are to test for and achieve envelope airtightness levels as specified in 01 83 16 Part 2.

.6 Total Cost of Ownership Analysis

.1 Summary

In order to assist project teams assess the Total Cost of Ownership (TCO) implications that decisions have throughout the course of design, McGill has developed a Total Cost of Ownership template to compare construction alternatives. It is best practice to include building operations staff in all TCO and value engineering review.

.2 With the assistance of a representative from the Utilities and Energy Management department, the engineer is to perform the required TCO analyses according to McGill's Total Cost of Ownership Calculation for Facilities Asset Management Framework (see table 1.5 below for details) to compare design options based on impacts on GHG, energy cost, maintenance costs, etc. The scope of TCO will vary depending on project. The Project Manager and a representative from the Utilities and Energy Management department will determine together the scope of TCO analyses required. Requirements include:

.1 Design: TCO template for design options with 20-year impacts on GHG, energy costs, maintenance costs, etc.

1.5 Table of process phases for TCO led by the Project Manager

Process Phase	TCO Goals	Type of System	Internal Consultants	External Consultants
Scoping	. Develop a benchmark budget with design and construction cost estimates based upon data from previous projects . Develop an operations and maintenance (O&M) benchmark budget based on existing campus buildings	Energy Systems	Utilities & Energy Management: Energy Manager Building Operations: Maintenance Mechanical Engineer	Electrical Engineer Mechanical Engineer
		Water Systems	Utilities & Energy Management: Utility & Energy Maintenance Officer Building Operations: Maintenance Mechanical Engineer	Mechanical Engineer
		Lighting Systems	Building Operations: Maintenance Electrical Engineer	Architect
		Maintenance	Buildings & Grounds : Building Services Officer Design Department: Senior Manager Architecture	Mechanical Engineer
		Architectural Design	Design Department: Senior Manager Architecture	Architect

		Finishes	Buildings & Grounds : Building Services Officer Design Department: Senior Manager Architecture	Architect
Feasibility & Programming	Develop TCO Options for the following possible categories: • Energy Systems: Central vs. stand-alone Alternative energy systems • Mechanical Systems: Air distribution systems	Energy Systems	Utilities & Energy Management: Energy Manager Building Operations: Maintenance Mechanical Engineer	Electrical Engineer Mechanical Engineer
	• Mechanical Systems: Water distribution systems	Water Systems	Utilities & Energy Management: Utility & Energy Maintenance Officer Building Operations: Maintenance Mechanical Engineer	Mechanical Engineer
	• Electrical systems: Indoor lighting sources and controls Outdoor lighting sources and controls Distribution	Lighting Systems	Building Operations: Maintenance Electrical Engineer	Architect
	• Siting/Massing: Orientation and massing Landscape, irrigation, and hardscape • Structural Systems: Systems and material selection • Building Envelope: Skin and insulation options Roofing Glazing	Architectural Design	Design Department: Senior Manager Architecture	Architect
Schematic Design	• Conduct studies to review TCO options;	Energy Systems	Utilities & Energy Management:	Electrical Engineer

	Prioritize studies based on the simplicity of the analysis and the level of cost impact: 1) Simple analysis with high-cost impact 2) Simple analysis with low-cost impact 3) Complex analysis with high-cost impact 4) Complex analysis with low-cost impact • Select cost-effective alternatives based on the studies conducted considering cost, user preferences, recommendations, and payback findings Payback guidelines: <5 years should be incorporated 6-10 years encouraged to incorporate >10 years may use discretion		Energy Manager Building Operations: Maintenance Mechanical Engineer	Mechanical Engineer
		Water Systems	Utilities & Energy Management: Utility & Energy Maintenance Officer Building Operations: Maintenance Mechanical Engineer	Mechanical Engineer
		Lighting Systems	Building Operations: Maintenance Electrical Engineer	Architect
		Maintenance	Buildings & Grounds : Building Services Officer Design Department: Senior Manager Architecture	Mechanical Engineer
		Architectural Design	Design Department: Senior Manager Architecture	Architect
		Finishes	Buildings & Grounds : Building Services Officer Design Department: Senior Manager Architecture	Architect

Design Development	• Review TCO studies to confirm and verify results produced by the project development stage	To be reviewed by Project Manager
Construction Documents	• Confirm value engineering decisions	To be reviewed by Project Manager

END OF SECTION