

SUSTAINABILITY ACTION PLAN

Submitted to:

American Institute of Architects
AIA 2030 Commitment

January 2013

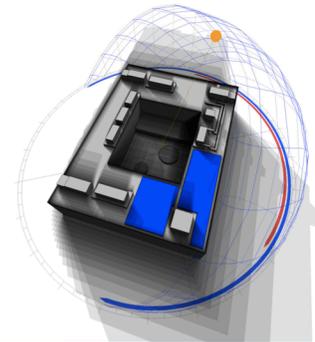


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Thornton Tomasetti

1.0 INTRODUCTION

With the built environment as the single biggest contributor of greenhouse gas emissions, any successful strategy to reduce carbon emissions and combat global climate change must include building efficiency gains as a key component.

We therefore believe it is imperative for our industry (architecture, engineering, construction) to work toward a fundamental transformation in how buildings are designed, constructed and operated – toward incremental carbon footprint reductions with the ultimate goal of carbon neutrality.

1.1 Who We Are

Thornton Tomasetti is a global leader in engineering design, investigation and analysis serving clients worldwide on projects of all sizes and complexity. With practices in Building Structure, Building Skin, Building Performance, Construction Support Services, Property Loss Consulting and Building Sustainability, Thornton Tomasetti addresses the full life cycle of buildings.

Founded in 1956, today Thornton Tomasetti is a 700+ person organization of engineers, architects and support personnel collaborating from 26 offices across the United States and in Asia-Pacific, Europe and the Middle East.

1.2 Our Commitment

In July 2010 Thornton Tomasetti became the first predominantly structural design firm to join the AIA 2030 Commitment, which promotes the goal of carbon-neutral building by 2030.

We are committed to maximize efficiency and sustainability of all our projects in close collaboration with all members of the design and construction team. Therefore, we will evaluate all our projects for sustainability opportunities as our 'business as usual' approach - irrespective of whether a project has a defined sustainability agenda.

To meet this commitment, we are preparing a mechanism to quantify, track and ultimately reduce the embodied energy and carbon values of the structures we design.

At Thornton Tomasetti we are certain that the building model of the future will be dramatically "greener" than that of the past – any other scenario is simply, well, unsustainable. We are firmly committed to contribute our part on our collective way to a more sustainable built environment.

2.0 OUR WORK

Thornton Tomasetti is a leader in engineering design, investigation, and analysis with a multitude of service lines delivered through our six practices. Given the complex interdependencies between building components and systems and the increasing emphasis on high-performance characteristics, we realize that sustainability considerations need to inform most, if not all, of what we do.

Thus, beyond 'traditional' design criteria, such as strength, constructability, serviceability, cost, etc., we have an obligation to also consider sustainability criteria, such as operational efficiency, thermal efficiency, and carbon footprint as we devise our building designs.

We realize that we can succeed in reducing the built environment's energy consumption and associated greenhouse gas emissions only if we look beyond new construction projects and also focus on increasing the efficiency of existing buildings. We have a long history of working on new and existing buildings and know that with our diversified set of services and multidisciplinary team approach we can be instrumental in realizing smart, high-performance building solutions.

2.1 Our Practice Areas & Sustainability Opportunities

The following is a brief summary of Thornton Tomasetti's six practice areas and the sustainability opportunities for each.

Building Structure

Our engineers design structural systems for buildings of all types and sizes at locales throughout the world. We apply both traditional and cutting-edge building materials and structural systems, and consider both indigenous and newly introduced construction methods.

We realize that our structures typically account for a majority of a building's mass, and as such a majority of the total embodied energy/embodied carbon (EE/EC) as well. Therefore, we have set out to implement a firm-wide mechanism to quantify and track the EE/EC values of our structural design projects, whenever possible within, or aided by, a building information model – with the aim of over time learning from the results and developing design strategies to effectively reduce these impacts.

Beyond the area of EE/EC, there are other ways that structural design decisions can positively affect a project's sustainability – either via optimizing our structural designs, or as part of synergistic measures devised in collaboration with other disciplines. (Refer also to chapter 3.2 below.)

Building Skin

Our skin specialists assist in engineering of innovative, constructible, cost-effective, thermally efficient building skin solutions, ranging from traditional curtain walls to the use of structural glass and through all phases of design and construction.

Knowing that the thermal properties of the building envelope are critical for

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overall energy performance, we strive to conceptualize building skin systems that minimize thermal bridging, maximize thermal resistance and incorporate effective shading strategies that together support the building's energy and daylighting concepts.

To achieve these desired high-performance outcomes, we utilize a variety of advanced computer simulation tools to model and optimize the structural, geometric, thermal, and light transmission properties of our building skins.

Building Performance

Our team of multidisciplinary building performance professionals offers expertise throughout a building's life cycle and relative to all building components and systems. We recommend maintenance regimes and guide owners through expansions, adaptive reuses, rehabilitations and upgrades.

In recent years energy efficiency has emerged as a key building performance indicator. Thus, the modus operandi of many buildings in the past of merely maintaining code required life safety and performance levels is gradually giving way to improving building performance and to reduce energy and water consumption and the associated operational cost.

With Thornton Tomasetti's comprehensive knowledge of architectural, structural, and MEP building components and systems and their interrelatedness, we are positioned to devise holistic performance solutions that combined amount to more than the sum of their parts.

Construction Support Services

Our construction support services address a wide range of needs to efficiently move a project from concept to delivery, serving developers, construction managers, fabricators, erectors, and general and specialty contractors. Through our building information modeling (BIM) services we develop and deliver steel, concrete and precast models, provide connection designs, and deliver shop drawings – both in integrated project delivery (IPD) as well as in traditional settings.

Utilizing BIM platforms that support integrated processes increases the sustainability of the construction process by facilitating paper reduction and, more importantly, construction waste reduction due to high levels of accuracy in the model. Thornton Tomasetti is at the forefront of employing not only common BIM tools, but also developing custom software applications that further streamline project delivery.

Property Loss Consulting

Our multidisciplinary PLC staff specializes in investigative engineering and architectural and construction material evaluation to assist attorneys and insurance companies with claims evaluations. Our scientific investigation provides our clients with a thorough assessment of damage or defects, as well as analysis of causation that can be used for retrofit, repair, claims adjustment or litigation.

We anticipate that the green building features of buildings will increasingly

become subject to damage or performance disputes. With our knowledge of sustainability strategies and technologies and the suite of LEED rating systems, we can evaluate any underlying technical issues and advise our clients throughout claims adjustment, litigation, remediation or recertification.

Building Sustainability

Our sustainability practice is tasked with finding projects, clients and design teams who are seeking sustainable innovation. Through collaboration, we use whole systems thinking to achieve the right balance on every project between the economic, social, and environmental factors.

Our sustainability experts offer LEED consulting and administration; sustainable building strategies; energy and daylight modeling; owner's sustainability representation; education and training; and innovation in green building – integrated design practices that go well beyond the LEED rating system.

Integral to our success is our energy and environmental analysis skills that enable us to provide the data to achieve the best integrated building solutions. Collaborating with Thornton Tomasetti's Skin Practice and Advanced Computational Modeling group we are developing custom integrated analysis/optimization tools to evaluate design alternatives and maximize building efficiency throughout the design process.

2.2 Structural Sustainability Best Practices

Structural design accounts for a majority of Thornton Tomasetti's work. At the same time, the structural engineering community is not generally thought of as being at the forefront of sustainability. Hence, we can make a significant contribution to building sustainability if we identify and implement ways in which our structural designs can improve building efficiency and reduce environmental impacts in terms of carbon emissions and general resource consumption (energy, water, raw materials.)

To aid Thornton Tomasetti's project teams around the globe with the implementation of structural engineering strategies designed to increase project sustainability, we are developing an internal "Structural Sustainability Best Practices" document that will be made available to all structural design staff.

The purpose of this document is not to advocate that sustainability should trump all other performance criteria, but rather to educate all staff on the range of viable sustainable design strategies, providing them with the proper tools and resources, and to encourage consideration of sustainability objectives throughout the design process.

A summary of Thornton Tomasetti's "Structural Sustainability Best Practices" document is attached as Appendix A.

2.3 Energy and Carbon Reduction

A building's life-cycle energy use and associated carbon footprint generally comprises three distinct areas:

- Operational energy used for ventilation, heating, cooling, lighting, and powering appliances and equipment.
- Energy used to transport building occupants to and from the building from other locations.
- Embodied energy used for material extraction, refinement, manufacturing of building materials and components, transportation, and construction activities.

At Thornton Tomasetti, we have the opportunity to analyze and affect both the operational energy and embodied energy of the buildings that we work on.

Operational energy

Thornton Tomasetti's Sustainability and Skin practices are both focused on operational energy efficiency: Smart integrated sustainable design concepts, coupled with energy analyses and daylighting studies performed by our Sustainability practice and thermally efficient building envelopes realized by our Building Skin practice have the shared goal of improved energy efficiency.

To determine our success as green building consultants in reducing the operational energy used over time in a building and improving overall building performance, we compare, whenever possible, real-time data over one year of the building's operation with the predictions from our energy models that informed building design.

Embodied energy

The embodied energy share as a percentage of the total life-cycle energy use is by no means insignificant, and with increasing levels of operational energy efficiency this percentage will only increase.

Furthermore, we know that a majority of a building's total embodied energy/carbon footprint is often represented in our structural design scopes. Thus, in the spirit of the AIA 2030 Commitment with its main objective of carbon emissions reduction, we realize that we need to also focus on the EE/EC side of the energy equation.

Therefore, to quantify the "carbon efficiency" of our structural designs and measure our carbon reduction progress over time, we are developing a custom carbon tracking tool to aggregate the EE/EC impacts of our projects across our entire design portfolio.

This will allow us over time to expand our knowledge about the relative carbon efficiency of various design strategies and parameters, and to further refine our structural best practices accordingly.

We envision that the results of our EE/EC aggregation efforts will constitute a key component of Thornton Tomasetti's annual AIA 2030 Commitment reporting (as opposed to Energy Unit Intensity and Lighting Power Density values that are reported by architectural firms.) Since there is no established structural EE/EC baseline, the results of our first reporting period will become the baseline against which we will measure our hoped-for improvement.

2.4 Design Process and Tools

For some time, Thornton Tomasetti has been a champion of integrated project delivery (IPD) processes and building information modeling (BIM) tools. We have developed many custom tools for geometry optimization and interoperability that increase our design productivity and result in increased accuracy of our work product.

As an industry, we are in a transitional phase where new delivery models and associated BIM tools are constantly developed. Yet, the rate of adoption among the involved stakeholders (architects, engineers, contractors) varies and is far from universal. Furthermore, the level of interoperability between the multitude of BIM platforms is often limited or not possible at all.

Process

The Integrated Design Process is a fundamentally different approach, compared to the conventional, for managing the design process. Contracts need to be structured differently, more research and analysis are required earlier in the process, and all stakeholders need to participate in several sustainability workshops/charrettes. While this adds a level of complexity to the design process and needs to be properly managed, the potential rewards are significantly higher performing buildings at minimal to no additional cost.

In the green building community it is an article of faith that an Integrated Design Process is key to sustainable building outcomes. Yet in reality, for a variety of reasons, integrated design and delivery processes are not always implemented. Nevertheless, we recognize that integrated, collaborative design processes are a prerequisite for realizing the best possible sustainability outcomes, and we will continue to support and participate in them whenever we can.

Our Sustainability practice has adopted and follows the ANSI Standard – *ANSI/MTS 1.0 Whole Systems Integrated Process Guide (WSIP)-2007 for Sustainable Buildings & Communities*. This standard provides a structured design process framework with a series of workshops to effectively manage the optimization of complex systems and achieve high levels of sustainability performance.

Tools

At this point, the various tools to model sustainability performance (energy modeling, daylighting simulation, thermal heat flow analysis, computational fluid dynamics, life cycle assessment) are not fully integrated and, for the most part, not tied to the BIM platforms used by architects and structural

engineers.

Thornton Tomasetti's intends to not only maintain our structural BIM leadership position but to also integrate sustainability/energy performance modeling tools into our existing software infrastructure, and, to the extent necessary, to develop custom tools that facilitate interoperability and data aggregation.

To that end, we have started an initiative to “bridge the gap” between thermal analysis tools specific to the building skin and whole building energy modeling tools, with the objective of increasing the accuracy of the energy models by feeding them with thermal envelope performance data directly from the building skin tools that is more refined than what the energy model software typically allows for. Coupled with parametric iteration tools we will have the means for advanced analysis-driven optimization processes for building envelope systems and their thermal and visual qualities.

In parallel, we have developed an early interactive design optimization tool that provides instantaneous feedback on the embodied carbon footprint of basic structural systems and allows for an analysis of how fundamental structural design decisions and material choices affect a project's “embodied carbon efficiency.”

3.0 OUR OPERATIONS

Thornton Tomasetti endeavors to conduct its business operations and practices in a way that is consistent with our values and beliefs. As such, our commitment to sustainability is not only reflected in our work product we deliver to our clients and the resulting built structures, but also in the way we operate our offices, the opportunities we offer to our staff and the role we play in our industry.

3.1 Sustainable Operations Policy

In our offices we aim to reduce our environmental footprint by limiting our consumption of energy, water and office supplies, reducing waste generation, and providing a healthful indoor environment. Our corporate guidelines for sustainable office operations provide a framework for the implementation of this policy. These guidelines are mandatory for all Thornton Tomasetti offices, unless implementation of particular measures is prohibitive due to lease constraints or cost considerations, or simply not practical due to particular building/space conditions. Each office will organize an employee committee to determine the most appropriate implementation strategy considering the economic, technical, and legal constraints and opportunities for each office location.

Major installations of more efficient systems will occur during new office build-outs or major renovations of existing offices. The Corporation supports these efforts by the offices and will provide funding for major installations when part of office build-out budgets or when otherwise appropriate to the particular situation.

All new U.S. office fit-outs are required to seek LEED for Commercial Interiors certification, unless the prerequisites or Minimum Program Requirements for this certification cannot be met or if LEED for Commercial Interiors certification is economically unfeasible. Thornton Tomasetti applies this policy to achieve its corporate sustainability goals, but also with the understanding that this is a good financial decision considering the potential operational savings of an energy-efficient office. The firm provides financial assistance to each office seeking certification, and the participation of in-house LEED APs in managing the process reduces certification costs.

Thornton Tomasetti will measure the baseline energy use, water use, and waste generation of our offices and calculate each office's carbon footprint. Every two years, the firm will conduct an office operations inventory and compare recent data to the baseline to assess progress toward our sustainability goals for office operations.

3.2 Education

We recognize that technical knowledge about sustainability technology and strategies is key to our ability to participate in integrated design processes and to contribute to sustainable project solutions. Therefore we encourage

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and actively support all employees in obtaining and maintaining their LEED credential.

Thornton Tomasetti has currently more than 170 LEED credentialed employees representing about one third of the entire firm, and we constantly strive to increase this percentage,

To support all current LEED Green Associates and Accredited Professionals with the task of satisfying continuing education requirements, we have implemented a firm-wide lunchtime seminar/webinar program that will allow participants to accrue the requisite number of education units. We also support employees in completing the requirements to get a LEED accreditation by reimbursing the exam fee.

In addition to our internal education programs, we educate the public and private groups in the U.S. and abroad about green building and LEED through the USGBC Faculty™ designation.

4.0 OUR BUSINESS STRATEGY

Over the past decade we have witnessed the growing importance of sustainability in our industry – not only in the US, but throughout the world. While the global economic crisis has certainly slowed the growth of green design and construction, there is no doubt that with economic recovery, sustainable design and construction will be more in demand than ever before – reflecting the transformation of the market toward a more sustainable and carbon-efficient model. Thornton Tomasetti is committed to participate in this ongoing transformation through the application of our technical expertise and delivery of our professional services.

We are continually refining and adding to the set of services we provide to our clients. As such, we realize that in an era of increasingly integrated designs and focus on sustainable high-performance building, we need to possess a high level of multidisciplinary technical expertise to make high-performance outcomes possible – and we need to make a concerted effort to stay on the forefront of the constantly evolving set of sustainability technologies.

In this spirit, Thornton Tomasetti acquired the green building consulting firm Fore Solutions in January 2012 to significantly expand its sustainability consulting services and integrate green objectives across all its practices. With this acquisition Thornton Tomasetti's Building Sustainability practice was officially launched, and, based on the strength of Fore Solutions capabilities, experience, portfolio and reputation, the practice is well positioned for future growth.

In addition, we developed the position of Corporate Sustainability Officer, which assigns the oversight of implementation of the AIA 2030 Commitment and the associated Sustainability Action Plan to a lead individual.

We will continue to evaluate the marketplace, available and emerging technologies and services, so that we can add and refine the building sustainability services that our clients will need to realize their visions of green buildings.

As structural design engineers we strive to support our design partners (architects MEP engineers, etc.) in the design of sustainable building. We know that we have significant contributions to make, and - with the help of our Best Practices guidance document – we plan to gain a level of sustainability knowledge and awareness among our structural engineers that will set us apart and that allows us to team up with like-minded project partners.

APPENDICES

Appendix A – Sustainability Best Practices for Structural Engineers - Summary

Appendix B – Sustainable Operations Guidelines v3.0



Appendix A

Sustainability Best Practices for Structural Engineers - Summary

Prepared By

Lee Fritz, P.E., S.E., LEED AP BD+C
Ken Maschke, P.E., S.E., LEED AP BD+C
Rachel Michelin, R.A., LEED AP BD+C
Sarah Vaughan, P.E., S.E.

July 2011

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1.0 INTRODUCTION

Sustainability is best achieved in structures when the big picture is considered and thoughtful approaches are taken during design. A commitment may be required of the design team to elevate the priority of sustainability. Structural engineers are stakeholders in the design process (whether it is integrated or not) who can suggest innovations and systems that may not always be strictly structural in nature but facilitate the overall sustainability of the project.

The design and construction of sustainable structures requires structural engineers to take a thoughtful approach in both their typical scope of work and beyond. Structural engineers can play a leadership role in project management throughout the design, construction and service life of a building. A thorough understanding of sustainable design concepts and how they apply to building components and systems is required. Thornton Tomasetti utilizes its knowledge of building materials to make appropriate design choices.

The following sections provide an outline of Thornton Tomasetti's best practices to increase the sustainability of the structures we design. The bulleted items are drawn from a more detailed internal technical guidance document named "Sustainability Best Practices for Structural Engineers".

2.0 PROJECT MANAGEMENT

It is critical for structural engineers to participate in sustainability decisions throughout the design, construction and service life of a building. A truly integrated design process includes the expertise in building concepts and components that structural engineers can contribute.

During the schematic development of a project, Thornton Tomasetti helps educate our clients about green design incentives and requirements that may be available/applicable to the project. As the project takes shape, we help define suitable design criteria that achieve the project's sustainability goals. If possible, we seek synergies through the integration of building systems with the structure. Throughout the construction process and throughout occupancy, Thornton Tomasetti offers services that uphold the sustainable performance of the building.

The following list summarizes the contributions that structural engineers can make throughout all project phases to promote sustainability.

SCHEMATIC DESIGN

- Ensure that the desire for a sustainable structure has been reflected in contracts.
- Consider whether the project will benefit from regional incentives for sustainable design and practices.

- Suggest that the project schedule allow for sustainability to be properly designed, developed, bid, and constructed.
- Advocate for integration of building systems with structure.

DESIGN DEVELOPMENT

- Select appropriate design criteria while allowing for future flexibility where desirable.
- Apply sustainable design concepts and select appropriate materials for building components.
- Design the structure for a long service life.
- Perform a quality assurance review to ensure that sustainability criteria and green certification requirements (e.g. LEED) have been incorporated into the construction documents.

CONSTRUCTION & SERVICE LIFE

- Communicate desired sustainability outcomes to contractors.
- Engage Thornton Tomasetti's full range of practice areas, including Building Performance, Building Skin, and Construction Support Services, to provide expertise in sustainable design and construction beyond the typical scope of the engineer of record.
- Offer Thornton Tomasetti's expertise in repair and building maintenance to perform renovations that maintains the sustainable performance and occupancy of the structure.

3.0 DESIGN CONCEPTS

A thorough understanding of sustainable design concepts and how they apply to building components is required. Thornton Tomasetti evaluates design concepts and strategies for each project to determine where sustainable opportunities exist. The following list summarizes structural design concepts at our disposal to increase a project's sustainability.

- Building Reuse – Preliminary design can capitalize on reusing portions of an outdated existing building in lieu of complete demolition.
- Material Reuse – Specifying salvaged structural components and materials, whether used as an original product or down-cycled.
- Thermal Bridging – Detailing consideration of thermal breaches in the building envelope due to steel components and other thermally conductive materials.
- Thermal Mass – Intentional use of massive structural components for insulation and temperature regulation within the building.

- Exposed Structure – Reducing architectural finishing components through thoughtful planning and detailing of structural components.
- Evaluate and minimize the embodied energy and embodied carbon footprint of the structural system.

Additional strategies can be coordinated with the owner based on their long-term goals for the building and desired level of future flexibility.

- Design for Future Use – Consideration of future expansion needs or changes in use can provide the owner with added value, and save the building from becoming obsolete prematurely.
- Enhanced Durability – Going beyond code required minimum standards to ensure the structure and building envelope remain maintainable and in good condition for the intended service life of the building.
- Design for Deconstruction – Detailing and designing structural components for disassembly (in lieu of demolition) without producing waste creates added value in terms of sellable materials, reduces landfill, and reduces carbon emissions.

4.0 BUILDING COMPONENTS

Structural engineers can have a large impact on the design process by contributing to major design decisions on the size and configuration of various building components.

Sustainable designs strive to employ the most efficient load path in order to reduce the amount of total material used. Structural details should accommodate maintenance, durability, and accessibility for future repairs. Overall, the sustainable aspects of a building will benefit when individual structural components are designed with the entire structural system in mind.

Building components include all major systems requiring structural design, including the building foundations, superstructure, facades and roof.

FOUNDATIONS

- Consider techniques to reduce environmental impact of earthwork and foundation construction (i.e. balance cut and fill, re-purpose demolition rubble for sub-base, reduce spoil removal, avoid affecting the groundwater table).
- Reuse existing foundations where practical.
- Reduce the number of columns that must be supported on independent foundations.
- Suggest integrating geothermal systems into the foundations.

SUPERSTRUCTURE

- Design structures with efficient load path by considering: piece counts,

optimal bay sizes, utilization of composite construction, optimization of members, etc.

- Integrate structure with mechanical systems such as providing for raised floor system, coordinate plumbing shafts with structural columns, insulated walls, etc.
- Locate lateral resisting elements for maximum efficiency, and seek to design for minimum serviceability criteria as through the use of wind tunnel testing.

FACADE

- Limit thermal bridging to reduce the amount of direct heat transfer through the building enclosure.
- Encourage the use of solar shading devices to reduce solar heat gain.
- Employ double-skinned façade systems to allow airflow between the inner and outer membranes for enhanced year-round thermal performance.
- Consider façade attachment to structure with regard to accessibility for maintenance and durability.
- Engage Thornton Tomasetti Building Performance group to assist the owner with long-term maintenance.

ROOF

- Design for adequate capacity for green elements, including vegetated roofs, photovoltaic panels, wind turbines, and solar thermal collectors.
- Consider waterproofing and other serviceability issues (i.e. vibration due to turbine vibrations)

5.0 STRUCTURAL MATERIALS

Structural engineering can have a positive impact on the sustainability of all projects through responsible specification and innovative use of materials. By early communication of project goals with regard to recycled, regional, reused and rapidly renewable materials, outcomes can be realized that benefit the project team and end user as well as the environment.

For each building type, efficiency in design should be sought using material-specific strategies and reducing waste by allowing for prefabrication of building components. Innovative use of nontraditional materials may be employed to advance the profession toward designing highly efficient and environmentally responsible structures.

- Whenever possible, specify that materials are to be locally sourced.
- Whenever possible, propose the use of recycled or reused materials, including post-industrial cementitious replacements.

- Design for efficiency using steel systems – consider increasing deck spans and reducing connections (and thereby reducing embodied energy).
- Limit reinforcing for concrete to code required minimum.
- Specify use of precast concrete to minimize site waste.
- Evaluate the merits of using cementitious substitutions for increased durability and/or carbon footprint reduction.
- Specify timber from sustainably managed forests, ideally from a local source.
- Consider whether salvaged wood timbers be obtained from a local supplier.
- If project contains load-bearing BRICK MASONRY, suggest that reclaimed materials be used and sourced locally.
- Consider using not-traditional structural materials provided safety and performance is not compromised.
- Discuss whether contractors and fabricator may be chosen based on their environmental practices.



Appendix B

Sustainable Operations Guidelines

V3.0 - November2012

Savings Potential	Category
1 OFFICE ENERGY USE	
1.1 Lighting	
Very High	Install occupancy sensors: Install occupancy sensors in conference rooms and, whenever appropriate, in common areas (hallways, kitchen, bathrooms) and private offices if economically feasible. [See <i>Sustainable Operations Policy</i> regarding major installations.] Lights in any occupancy sensor controlled space are to be turned off after 10 minutes of inactivity.
Very High	Schedule settings: Office lighting in common and open office areas is to be controlled by timers that turn the lights off between 8pm to 7am (except for emergency lights). [If no Building Management System, see <i>Sustainable Operations Policy</i> regarding major installations.]
Very High	Use high-efficiency lighting: As bulbs require replacement, replace incandescents with CFLs or LED bulbs, and when installing light fixtures use only new CFL, LED or other high-efficiency lighting fixtures.
High	Employee engagement: All employees are required to: <ul style="list-style-type: none"> - turn off individual task lights whenever they are not at their desk - when working late or on weekends, to turn off lights that are not in use upon leaving the office
1.2 HVAC	
Very High	Schedule settings: Air conditioning is to be set back between the time when employees typically arrive and when they leave on weeknights, and if feasible should be limited on weekends. (Server rooms and other spaces where air conditioning is critical are exempt.)
Very High	Control HVAC settings: Work with building manager to calibrate control settings to ensure not to overheat or overcool spaces.
High	Employee engagement: All employees are required to: <ul style="list-style-type: none"> - report on their comfort level every 6 months through occupant surveys administered by the Corporate Sustainability Department - turn off space heaters and personal fans when not in use
Medium	Install demand-control ventilation: Install demand-control ventilation system in conference rooms to reduce air flow and energy used for ventilation when not needed. [See <i>Sustainable Operations Policy</i> regarding major installations.]
1.3 IT infrastructure and equipment	
High	Control computer settings: When computers are on, those that are idle for more than 20 minutes will be put into "Sleep" mode.
High	Control other equipment settings: To the extent technically feasible, copiers, printers, plotters, and other office equipment is to be powered down overnight and over weekends.
High	Employee engagement: All employees are required to shut down their computers and monitors when leaving work at the end of the day unless overnight work is being performed. If employees will not be using their computer for a number of days, due to vacation or other reasons, they are expected to unplug their computer so that it does not get automatically turned on by IT.
1.4 Measurement and tracking	
Very High	Measure energy use: Install submeter or other suitable measurement device to measure and record office energy use. [See <i>Sustainable Operations Policy</i> regarding Installations.]
Very High	Track performance: Inventory baseline data (energy, water, waste, etc.) and conduct a carbon footprint analysis every two years in collaboration with the Corporate Sustainability Department, which leads this effort.
High	Report progress on corporate sustainability: The Corporate Sustainability Department will produce a regular sustainability report for public reporting. Offices briefly report on progress at the TT Annual Meeting.
High	Employee engagement: Employees are encouraged to participate in energy competitions between offices comparing per capita energy use and to provide operations data when required to assist the Corporate Sustainability Department with measurement and tracking.
2 OFFICE WATER USE	
2.1 Fixture efficiency	
High	Select fixtures with low flow/flush rates when replacing or upgrading to have, at a maximum: <ul style="list-style-type: none"> - Toilets: 1.28 gpf (all new toilet fixtures shall have dual-flush feature) - Urinals: .125 gpf - Lavatories and sinks: .5 gpm Outside the U.S., please use best practices for water efficiency in your region.
Medium	Include motion sensing when replacing or upgrading lavatory sink fixtures.

See the Corporate Sustainability Department Skyline page (click on "Wiki") for resources to assist in implementing the guidelines.

Savings Potential	Category
3 CONSUMABLES AND WASTE MANAGEMENT	
3.1 Paper use	
Medium	Use 2-sided as default: Set default setting on copiers and high-volume printers as follows: - Copy mode: 1-sided to 2-sided - Print mode: 2-sided
Medium	Use paperless procedures: Encourage the use of electronic documents and forms to reduce paper consumption. Consider strategies such as electronic shop drawing processing, bluebeam markups, and project websites for document exchange.
Medium	Use paperless or sustainably-certified materials for Marketing: Print brochures, bifolds, annual report, christmas cards, etc. on recycled-content paper from FSC-certified sources. Use electronic marketing (PDFs) instead of paper whenever possible.
Low	Employee engagement: All employees are encouraged to be mindful when printing or copying documents and to consider the following questions: - Do I really need a hardcopy of this document or can I use scrap paper for this purpose? - Can I print multiple pages per sheet without losing important information?
3.2 Sustainable purchasing	
High	Purchase Efficient Monitors: Replace any existing CRT monitors with and/or purchase only new LCD monitors through regular purchase and upgrade procedures.
High	Purchase Energy Star equipment and appliances: For eligible equipment types, including computers, monitors, copiers, printers, scanners, refrigerators, dishwashers, and space heaters: Purchase only Energy Star rated equipment and appliances through regular purchase and upgrade procedures; or (outside of the US) purchase equipment that complies with an equivalent national standard.
Medium	Purchase 100% recycled paper: General office use letter, legal and tabloid sized paper to be 100% post-consumer recycled.
Medium	Purchase only duplex-capable printers: Upgrade existing printers not capable of duplexing, with duplex upgrade kit; and purchase only duplex-capable new printers.
Medium	Purchase ongoing consumables from Thornton Tomasetti's shopping list on Staples EWay if in the U.S., or purchase office products with high recycled content and low toxicity from your regular supplier: Ongoing consumables are materials that are regularly used and replaced, such as toner cartridges, binders, and other office supplies. Thornton Tomasetti's EWay shopping list is comprised of the most sustainable options available through Staples.
Medium	Purchase nondisposable or biodegradable kitchen supplies: Implement the following measures: - Preference shall be given to non-disposable kitchen supplies. - Do not purchase any disposable cups. - Any disposable flatware, stirrers, cutlery shall be biodegradable.
Medium	Purchase "green" office furniture: When replacing furniture or moving into a new office, purchase used furniture when appropriate to the office, or buy the "green" option provided by current furniture vendors or furniture that is GreenGuard certified or an equivalent standard if outside the U.S.
Medium	Select "green" vendors: Give preference to food vendors that take steps to reduce their environmental impact (serve local and/or organic food, reduce dining waste, etc.) when the price is equal to that of other vendors.
Medium	Sell "green" items through TT Store: Select the "green" option offered by the vendor, when available and relatively equal in price, for the TT Store.
Medium	Eliminate individual bottled water: In all locations where good quality potable water is available from the municipal water supply: No bottled water for vending machines or meetings shall be purchased. Instead, provide filtered tap water via water dispensers.
Medium	Purchase green cleaning supplies: Purchase cleaning supplies that are Green Seal certified or that meet equivalent standards.
3.3 Waste management and recycling	
Medium	Recycle what is feasible: All offices are to participate in recycling programs and adhere to recycling policies put into place by the host building or the local municipality/borough. If no such recycling program is instituted, explore other locally available recycling options, and, if economically viable, engage a third party to transfer office waste into the recycling stream.
Medium	Reuse what is feasible: Engage in donation programs for durable goods.
Medium	Batteries, cellphones, and computers: All offices are to institute a used cellphones and computer collection procedure to divert them from the solid waste stream. Used battery recycling is encouraged.
Medium	Employee engagement: All employees are encouraged to participate in their office's recycling program and used equipment collection procedures, and are asked to be generally mindful about strategies to reduce waste.

See the Corporate Sustainability Department Skyline page (click on "Wiki") for resources to assist in implementing the guidelines.

Savings Potential	Category
4 EMPLOYEE COMFORT AND HEALTH	
4.1 Air quality	
High	Use non-toxic paints, glues, and sealants: When walls and other features are being painted, request no-VOC or low-VOC paints.
Medium	Replace air filters and ensure on-going maintainance by checking in with the landlord on a regular basis.
Low	Improve air quality with office plants: Purchase plants for conference rooms and common spaces.
4.2 Daylight and views	
High	Install window blinds appropriate to the orientation of the space and climate: Engage employees in utilizing the blinds for the best performance (i.e., closing blinds at night, etc.).
Medium	Maximize natural lighting: Place private offices on the interior and have open offices with accessibility to natural lighting when moving to a new office or undergoing a major renovation.

5 TRANSPORTATION	
5.1 Commuting	
High	Encourage carpooling: Provide an electronic or paper message board for identifying employees interested in carpooling or vanpooling.
High	Encouraging bicycling: Accommodate bicycle commuters by providing access to secure bike storage and shower/changing facilities if provided by the building manager. Consider city bike awareness programs.
High	Offer Pre-tax transit benefits to employees: Wherever possible, the firm provides pre-tax public transit benefits to its employees.
Medium	Provide flex-time: Allow for flexible schedules, within reason, to accommodate commuters dependent upon public transit schedules.
Medium	Consider telecommuting: Allow for occasional telecommuting when reasonable and appropriate to the work.
5.2 Business travel	
High	Provide videoconferencing: Provide an accessible video-conference facility for office use and ask employees to hold virtual meetings when in-person meetings are not necessary.
High	Encourage the most energy-efficient travel modes: All other parameters (including expediency) being reasonably equal, preference should be given to train travel over air travel.
High	Encourage fuel efficient car rental: Encourage compact and/or hybrid car rental for single passenger travel.
Medium	Choose "green" hotels: Encourage visitors to Thornton Tomasetti offices to stay in green hotels, and employees are encouraged to select green hotels from Expedia's Green Hotel Directory or the equivalent when making travel arrangements if cost and location are similar to other options.

6 OFFICE RENOVATIONS AND NEW BUILD-OUTS	
6.1 Process	
Very High	Form an internal project team to explore sustainability opportunities: Any office planning to move to a new location, undertake a substantial renovation/upgrade, or being established in a new location shall prior to the search for a suitable space (or prior to the start of the design process in case of substantial upgrades/renovations) form a TT-internal project team to discuss green building certification (i.e., LEED, BREEAM, ESTIDAMA) and other sustainability opportunities.
6.2 LEED CI certification	
Very High	Certify new U.S. offices through LEED Commercial Interiors (CI) certification, unless prerequisites cannot be met or if economically unfeasible: Give preference to lease spaces that are suitable for LEED CI certification. Incorporate provisions in new leases that promote sustainability and support LEED credits. Thornton Tomasetti's goal for the certification of its new office fit-outs is LEED-Gold or higher.

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