Sustainability Guidelines

Standard Operating Procedures

Empire State Building

Effective Date: January 1, 2024

EMPIRE STATE REALTY TRUST

Contents

INTRODUCTION & CONTEXT

Buildings presently consume 70% of electricity in the US and account for almost 40% of greenhouse gas (GHG) emissions. Empire State Realty Trust (ESRT) has been at the forefront of sustainability with industry leading energy efficiency and sustainability approach and initiatives, and it is critical for our organization to integrate sustainability throughout our organization and at all our assets.

The management and ongoing operations of our assets represent an opportunity for ESRT to optimize energy efficiency, reduce waste, promote sustainability and indoor air quality across our portfolio and demonstrate our innovation and leadership in the industry. By establishing portfolio level goals and priorities, asset level standards and requirements, resources, and responsibilities, these guidelines will help ensure that asset operations and functions are an active part of ESRT's commitment to providing top tier workplaces for our tenants, and advance the communities we live and work in.

Objectives

The Sustainability Guidelines are intended to accomplish the following goals:

1. Formalize ESRT's environmental strategy and focal points across all standing asset operations
2. Define clear sustainability goals at both the Portfolio and Asset levels, with associated timelines, metrics, and responsibilities
3. Provide a reference document on standards and best practices for Property Managers and Building Operations Staff
4. Drive asset-level action towards the achievement of ESRT's portfolio-wide sustainability goals
5. Improve the environmental performance and reduce the operational costs of standing assets

Scope and Requirements

The Sustainability Guidelines address ESRT's operational targets at both the portfolio and asset levels. At the portfolio level, it outlines the near- and long-term goals associated with each policy topic, as well as the actions and tracking items required to evaluate progress. At the asset-level, it provides property managers with set standards and requirements for implementing each policy topic, recommends best practices, and establishes documentation and timelines for demonstrating compliance.

The objective of this document is to establish criteria and methodology specific to ESRT's overall sustainability objectives, which should be adopted universally across the portfolio and may be customized as needed as applicable to individual assets. The Sustainable Guidelines shall be implemented for all standing assets whose operations are under the control of ESRT. All applicable asset-level strategies and best operational practices under each policy topic shall be implemented to the best of each property team's ability. The guidelines are implemented amongst the entire portfolio which includes:

111 West 33rd
250 W 57th
501 Seventh
1333 Broadway
1350 Broadway
1359 Broadway
1400 Broadway
Empire State Building
One Grand Central Place
Hudson Landing - 561 10th Ave
The Chesapeake – 345 E 94th
298 Mulberry
Metro Center
10 Union Sq East
77 W 55th St
1010 Third Ave
1542 Third Ave

Roles and Responsibilities

Driving change and achieving material gains in real estate environmental performance requires close collaboration and a continuity of effort among all links in the chain – from executives to property managers, building engineers, maintenance staff, vendors and tenants. ESRT's SVP and Director of Energy and Sustainability shall be primarily responsible for administering the Sustainability O&M Guidelines on a programmatic level, including:

- Ensuring property management teams are informed of and trained on the policies
- Tracking progress towards portfolio-level goals
- Communicating progress and achievements internally
- Performing periodic updates and communicating updates to property managers and other parties

It is the responsibility of all ESRT property management teams to demonstrate a working knowledge of the Sustainability Guidelines. Property Managers should be responsible for implementing the asset-level strategies as described in the policy, including:

- Adhering to standards specified
- Ensuring staff execution of policy
- Ensuring any contracted vendors are informed of and adhere to policy procedures
- Maintaining tracking documentation as specified in the policies
- Utilizing best practices

Building and site walk-throughs may be completed routinely by ESRT personnel to ensure policy adoptions and proper application.

Empire State Realty Trust Sustainability Matrix

ESRT has developed a customized approach to comprehensive energy efficiency and sustainability at our properties and is summarized in our ESRT Portfolio Sustainability Matrix, which highlights the measures implemented across the portfolio. These measures align with the overall approach outlined in the Sustainability Guidelines.

SUSTAINABILITY MATRIX

	Empire State Building	One Grand Central Place	1400 Broadway	111 West 33rd Street	250 West 57th Street	1333 Broadway	1350 Braodway	1359 Broadway	501 Seventh Avenue	First Stamford Place	Metro Center	The Victory	The Chesapeake
Whole Building Energy Retrofit Analysis (Replicate ESB Model)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Pending	Pending
Whole Building Energy Retrofit Implementation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Pending	Pending
Low-e window retrofit	✓	✓	✓	✓	✓	✓	✓	✓	✓				
High Performance Design and Tenant Installation Required per Lease	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Submetering of Alll New Tenant Spaces	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Utilities Billed by Submetering (As installed)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Building Management System (BMS) Status													
(1) BMS in place	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(2) No BMS in place													
(3)Partial BMS in place													
Energy Star Certification	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
Energy Star Tenant Spaces Certified Tenants	✓			✓	✓								
Indoor Environmental Quality Focus													
(i) Low/No VOC offgassing materials	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(ii)Regular IEQ Testing and Reporting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(iii)Enhanced filtration and/or air purification	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(iv)Demand Controlled Ventilation and CO2 management standard for tenant spaces	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Water Conservation Initiatives													
(i)Ultra low flow fixtures	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
usage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Waste Management / Recycling													
(i)Construction waste diversion target 90%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
audits	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(iii)Separate electronics and bulbs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(iv)Dual stream recycling for whole building	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Green Cleaning Products and Practices	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Green Pest Management Products and Practices	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Demand Response/Peak Load Shaving	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sustainability Committee and Tenant Engagement	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Annual & Long Term Sustainability Targets and Tracking	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Leadership & Sharing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

ENERGY & GREENHOUSE GAS MANAGEMENT POLICY

Context

Buildings account for approximately two-thirds of New York City's total GHG emissions. Owners and managers of commercial properties have a large role to play in meeting New York's carbon reduction goals as part of the overall goal to mitigate the impacts of climate change. Ensuring that building operations are energy efficient not only reduces emissions but also decreases building operational costs.

ESRT is dedicated to reducing the energy and carbon footprints of its properties wherever feasible. New York City established a goal to reduce greenhouse gas emissions by 40% by 2030 and 80% by 2050. Through participation in NYC's Green Code Task Force, 80X50 Technical Working Group, NYC Mayor's Carbon Challenge and the Climate Mobilization Act Local Law 97 Advisory Board, among other initiatives beginning in 2007, ESRT has committed to adopting and supporting the goals set forth by the city.

Objectives

Frequency	Goal	Portfolio Manager	Property Manager	Building Engineer	Sustainability Team
Ongoing	Ensure all property managers have access to and are familiar with their building's profile in ENERGY STAR Portfolio Manager	✓	✓		✓
One-Time	Standardize energy and GHG emission metrics and reporting cycle across all assets	✓	✓		✓
Annual	Evaluate compliance of all assets with the 2024 targets set by 2019 NYC Carbon Emission Limits Law (*LL97/2019*) and develop strategy to comply with future targets.	✓	✓		✓
	Maintain up-to-date and accurate ENERGY STAR profiles annually across the portfolio	✓	✓	✓	✓
	Pursue the ENERGY STAR designation for all buildings with scores above a 75		✓		✓
	Strive to ensure that whole building energy and GHG emissions is equal to or less than the GHG emissions from the prior year, normalized to weather and occupancy		✓	✓	✓
Quarterly	Report whole building energy and GHG emissions usage on a quarterly basis in ENERGY STAR Portfolio Manager at all assets		✓	✓	✓
Ongoing	Review and report on tenant submetered electricity data on a regular basis.	✓	✓		✓
Ongoing	Ensure demand response protocols are implemented at all facilities		✓	✓	✓
Ongoing	Prioritize underperforming assets for further engineering studies and upgrades.	✓	✓		✓

Responsibility

It is the responsibility of **Portfolio Managers, Property Managers, Leasing Managers., Tenant Services Coordinators, Engineering Teams, and Sustainability Team** to be aware of best practices and guidelines in this plan and implement where possible for all assets under ESRT's control. The **Portfolio Manager** will request updated Demand Response Plans from managers quarterly and will post the same to the Demand Management System (DMS).

Asset-Level Requirements

Part I: Baseline

To implement the Energy and Greenhouse Gas Management Policy, it is necessary to first understand what current factors impact energy consumption and GHG emissions. ESRT utilizes the EPA's ENERGY STAR Portfolio Manager tool across all assets to track and report energy consumption and corresponding greenhouse gas emissions. The following best practices will help to assess current conditions and identify opportunities for improvements:

Energy

- **Tracking:** Ensure that the asset has an ENERGY STAR Portfolio Manager profile set up, including:
    - Current usage, occupancy, floor area and schedule data
    - Complete and up-to-date whole-building energy and water values for all active meters

- **Building Energy Audit:** Conduct an energy audit that meets both the requirements of the ASHRAE preliminary energy use analysis and an ASHRAE Level 2 energy survey and analysis identified in the ASHRAE Procedures for Commercial Building Energy Audits or equivalent. ASHRAE Level 2 Audits evaluate building energy consumption by end use and identify areas with the greatest opportunities for improved efficiency. ESRT meets or exceeds the prescriptive definitions and processes set forth for an ASHRAE Level 2 Audit. ESRT meets and exceeds the requirements of NYC's LL87, which requires an energy audit and retro-commissioning every ten years, based on the block and lot number of the property. Properties who have completed a Level 2 audit can also conduct an ASHRAE Level 3 audit, which builds on the findings and recommendations of a Level 2 audit by offering more in-depth engineering analysis of potential changes. ESRT's 2.0/LL97 analysis process exceeds the prescribed scope of an ASHRAE Level 3 audit. Before pursuing an ASHRAE Level 2 or Level 3 audit, confer with your portfolio manager and the SVP and Director of Energy and Sustainability to determine the appropriate approach to pursuing an energy audit.

- **CFR & OMP:** Prepare and maintain a current facilities requirement (CFR) and operations and maintenance plan (OMP) that contains the information necessary to operate the building efficiently. The plan must include the following:
    - a systems narrative describing the mechanical and electrical systems and equipment in the building;
    - a current sequence of operations for all equipment described in the systems narrative;
    - the building occupancy schedule;
    - equipment run-time schedules;
    - setpoints for all HVAC equipment;
    - setpoints for lighting levels throughout the building;
    - minimum outside air requirements;
    - any changes in schedules or setpoints for different seasons, days of the week, or times of day; and
    - a preventive maintenance plan for all building equipment described in the systems narrative.

- **Refrigerant Management:** Document complete schedule of existing and new mechanical cooling and refrigeration equipment, including equipment type, refrigerant used, installation date and manufacturer.

- Identify if any refrigerants with high Global Warming Potential (greater than 2,500 GWP) and Ozone Depletion Potential are in use. (i.e. any CFC-based refrigerants, which are currently banned by the Montreal Protocol, such as R-22, R-11).
- All CFC-based refrigerants were phased out of manufacturing by 2005.
    - HCFC-based refrigerants are in the final stages of phase-out. Most were phased out by January 1, 2020, and the remaining high-GWP refrigerants are scheduled for phase-out by January 2030. However, existing supplies may still be available for servicing older systems after the phase-out date. Note that under the AIM Act, some refrigerants, such as R-410A, now face earlier restrictions for use in new equipment starting in 2025

Phase Out Date	Refrigerants
January 1, 2020	R-22, 401A, 402A, 408A, 409A, 414B, 502A, 508A
January 1, 2030	R-123, 134A, 236FA, 402B, 404A, 407A 407C, 407D, 410A, 507/507A, 508B

Green House Gas Emissions

- **Standardize GHG tracking**: Standardize tracking in accordance with the Greenhouse Gas Protocol Corporate Standard to track Scope 1 (Direct Emissions), Scope 2 (Indirect Emissions) and Scope 3 (Tenant Emissions)
    - Utilize the *Corporate Accounting and Reporting Standard* for a step-by-step guide to quantifying portfolio-wide GHG emissions

- **Identify GHG risks:** Identify risks associated with potential carbon performance legislation (i.e. local law compliance)

- **Identifying cost effective reduction opportunities:** Review GHG emissions per asset and identify any top and low performers to conduct a more in-depth analysis to prioritize and identify cost effective reduction opportunities.

- **Set GHG reduction targets:** Begin setting GHG targets, measuring and reporting progress. Consider aligning targets with local carbon reduction goals, including NYC target of 80% reduction by 2050.

- **Participate in NYC Carbon Challenge: At** the asset level, ESRT participates in the NYC Carbon Challenge. This program is a voluntary leadership initiative where organizations and buildings commit to reduce greenhouse gas emissions by 30% or more over 10 years. Participation in the NYC demonstrates an organization and building's commitment to supporting NYC's energy and greenhouse gas reduction goals. More information on the program can be found in the Resources section.

Part II: Performance

The steps below outline the strategies for Property Managers, Engineers, and on-site building staff to improve asset energy and emissions performance.

- **Set and Track towards Performance Goals:** Utilize ENERGY STAR Portfolio Manager (ESPM) to benchmark and track whole-building energy and GHG emission data on a quarterly basis. It is important for Property Managers and Portfolio Managers to support and execute this data collection process to avoid data gaps. If a building has a score ≥ 75, it is eligible for an ENERGY STAR label designation and shall be pursued each year.

- **Identify the largest source of GHG emissions** from each asset and focus on energy savings measures related to reducing the usage of this energy source.
- **Ensure Energy Conservation Best Practices are in place.** See the Strategies and Guidance section below for more information.
- **Refrigerant Phase-Out Plan:** Develop and implement a plan to phase-out, within ten years, any assets with refrigerants with high Global Warming Potential (greater than 2,500 GWP) and Ozone Depletion Potential (i.e. replace any CFC-based refrigerants with legal and nonhazardous alternatives, such as R-410A).
- **Perform HVAC system maintenance** at regular intervals as recommended by the equipment manufacturers. Develop a building-specific comprehensive system maintenance manual and schedule-based checklist for engineering and maintenance staff. Track to ensure all maintenance tasks have been completed and follow-up to remediate anomalies discovered during routine maintenance.
- **Provide Training:** Provide energy efficiency training and education materials to superintendents and building maintenance staff responsible for servicing building equipment. Consider integrating into existing ESRT University Training Programs.
- **Evaluate Progress and Form Energy Management Plan:** Review tracking results on a biannual basis to identify performance trends. Identify specific action plans to improve performance. Solicit feedback from the property's maintenance team and the ESRT team to identify any internal or external factors that may necessitate revisions to the action plan (Please see Appendix **H-** for a template Energy Management Plan).
- **Capital Investments and Implementation for Energy Conservation Measures:** When considering capital investments and implementing major Energy Conservation Measures (ECMs), engage with Director of Energy, Sustainability, and ESG along with approved third-party consultants for further guidance on technical and engineering project implementation and management.
- **Educate tenants:** Provide guidelines, education, engagement, outreach, and materials to building tenants on energy-saving tips via email, meetings, and the ESRT+ app. Hold bi-annual or annual open educational training for all building occupants on energy conservation, combined with overall sustainability education and outreach including water, waste, IEQ and productivity/wellness programs and requirements.
- **Renewable Energy:** ESRT purchases 100% of its electrical power supply generated by renewable energy sources instead of directly from utilities to help meet GHG emission reductions goals and to encourage additive renewable energy development. As of 2022, ESRT's commercial portfolio is 100% carbon neutral.

Strategies and Guidance

Energy and Emissions Tracking

Identify all sources of energy consumption at the building, including all tenant energy sources wherever possible. Collect and track whole-building energy data using ENERGY STAR Portfolio Manager, for all buildings within the portfolio. It is best practice to review data within this tool on a quarterly basis, to create a habit of knowing and understanding a building's energy consumption patterns throughout the year.

The building characteristics and details (occupancy, operating schedule, square footage per use type, etc.) should be updated annually at a minimum. The building should report, at a minimum, its energy use intensity, GHG emissions intensity and ENERGY STAR score after each data update in comparison to the prior reporting period.

Annually, each building should pursue ENERGY STAR Certification if its score is 75 or higher. Whenever required, buildings shall ensure that compliance with any energy-related regulations is adhered to (including, but not limited to, NYC LL84, NYC LL85, NYC LL87, NYC LL88, NYC LL92, NYC LL94, NYC LL96/33, NYC LL97, etc.)

NYC Local Law Overview

NYC Energy Legislation	Description	Compliance Period/Deadline
LL84: Benchmarking	Requires annual energy benchmarking in ENERGY STAR Portfolio Manager	Annual – May 1
LL85: New York City Energy Conservation Code (NYCECC)	Requires buildings to meet the most current energy code for any renovation or alteration project.	
LL87: Energy Audits and RCx	Requires building to undergo a periodic energy audit and retro-commissioning study to inform building owners on building performance	Every 10 years based on tax block and lot number
LL88: Lighting Upgrades and Submetering	Submeters: Requires installation of electrical submeters for tenant spaces greater than 5,000 square feet and provides monthly energy statements. Lighting: Requires upgrade of lighting to meet current NYC Energy Conservation Codes	Deadline is 2025
LL92, 94: Green Roofs and Solar PV	All new buildings and alterations of existing buildings where the entire existing roof deck is being replaced must provide a sustainable roofing zone covering 100% of the roof (must include a solar PV system at least 4kW, a green roof system, or combination of the two.	All projects approved after November 15, 2019
LL95: Building Energy Efficiency Grades	Requires buildings to post an energy grade on the exterior of the building that corresponds with the ENERGY STAR Score. Refer to the table below for ENERGY STAR Score and corresponding letter grade.	2020 (based on 2019 ENERGY STAR Score submitted to the city on May 1, 2020)
LL96: PACE	PACE establishes long-term, low-interest Property Assessed Clean Energy (PACE) financing to fund upgrades to building energy and water efficiency	Financing available in early 2020
LL97 Carbon Performance Mandate	The most ambitious performance-based climate legislation establishes carbon emissions intensity limits for buildings. Buildings will be subject to fines over two compliance periods.	Requirements for two compliance periods: 2024-2029 2030-2034

LL95: NYC Building Energy Grades

Energy Grade	ENERGY STAR Score
A	85-100
B	70-84
C	55-69
D	1-54
F	Non-Compliant
N	No ENERGY STAR Score or Exempt

Energy Conservation: Operational Best Practices

ESRT prioritizes ROI-driven Energy Conservation Measures for development and implementation. To reduce energy consumption and the associated emissions, the following best practices are recommended:

- Track energy usage monthly and be alert for abnormalities or spikes. Compare to prior years' usage to identify the magnitude of usage that is "abnormal" for your building. Investigate abnormalities to identify the cause and potential remediation (if abnormality is due to factors within building management's control)
- Verify that HVAC equipment and lighting schedules are set to turn off or turn down when not in use, or areas that are unoccupied.
- When replacing light fixtures and bulbs or appliances in base building spaces, select ENERGY STAR rated LED fixtures and bulbs and ENERGY STAR rated appliances:
    - https://www.energystar.gov/products/light_fixtures
    - https://www.energystar.gov/products
- Make sure the building temperature is comfortable, not overheated or overcooled. The thermostat should be programmed for night setbacks to provide less heating (or cooling) at night.
- Make full use of automatic and programmable controls to optimize efficient operation.
- Refer to Appendix I for Energy Conservation Project Tracking Log.

Energy Management Plan & Capital Upgrades

Identify opportunities to improve energy efficiency and reduce consumption through institutional building operational knowledge of property managers and engineering staff supported by third-party technical studies (e.g. energy audit, retro-commissioning study, energy scavenger hunt). Create an Energy Management Plan to enact the projects and operational changes required to engage with the identified energy conservation measures (ECMs). This building's Energy Management Plan should contain an estimated timeline, budget (including projected savings), and specific action items with associated personnel responsibilities. Any performance targets set by local regulations or by ESRT's portfolio-wide goals should be considered in the Energy Management Plan as well. Please see Appendix H for a template Energy Management Plan.

The development of an asset-level Energy Management Plan involves synthesizing all acquired baseline and performance data into a sophisticated action plan. It should be developed with input from all relevant stakeholders and should be used as a living document to plan and chart the asset's ongoing performance goals.

Measurement & Verification (M&V):

Measurement & Verification refers to tracking energy usage over a long period of time to understand building energy performance over time, which is supported by Real-Time Energy Monitoring (RTEM) at ESRT properties. ESRT performs ongoing M&V of energy efficiency measures within tenant spaces. Additionally, our team of experts conducts M&V audits and Tenant Energy Management (TEM) analytics. We perform quarterly M&V on energy projects that have been implemented at select properties across the portfolio.

Demand Response Protocol

As part of ESRT's ongoing sustainability efforts, ESRT has partnered with ConEdison and NYISO to participate in an energy saving and grid reliability program, referred to as Demand Response (DR). Refer to Appendix J for Demand Response Enrollments by Property. Each property has installed a real-time market (RTM) tool, EnerTrac, to collect energy data and designed to integrate with IP-based applications including demand response programs.

Scope

This plan addresses the comprehensive action plan to curtail energy usage at all ESRT properties during demand response events. Curtailment refers to the action of interrupting electricity demand with respect to your current or baseline demand. The information outlined below describes the procedures and curtailment plan to interrupt (Reduce) electric demand when asked to do so temporarily. The following procedures are aimed at keeping our DR efforts coordinated to ensure the highest performance is achieved, and our local electric grid receives the requested relief during stressful grid load times.

Procedure

When the grid is under stress, or when test events are scheduled, NuEnergen will notify ESRT of the upcoming event either 2 or 21 hours prior. After confirming whether the event or test has been called, follow the steps outlined below:

1. ESRT and NuEnergen will communicate with Engineering and Property Management staff to confirm the specific hours, reduction targets and load management measures requested for curtailment.
2. The property team will log into EnerTrac to track performance against the targeted electric load for the duration of the event or test.
3. Property Tenant Service Coordinator (TSC) or Admin to distribute the building tenant DR brochure to ensure tenants and all building occupants are aware of the event and its intent (Appendix K).
4. Property Tenant Service Coordinator (TSC) or Admin to distribute DR notification to all tenants. Refer to Appendix L for Tenant Demand Response Notification E-Mail Template and Sample
5. During the morning of the event, activate Captivate Screens to remind tenants and encourage participation.
6. Review specific curtailment actions and adjust if necessary.
7. Pre-cool your building leading up to the event to take advantage of the building's residual thermal storage.
8. DO NOT begin reducing the electric load by 30 minutes to 1 hour before the start of the event or test.
9. Begin curtailment 45-60 minutes prior to the event to ensure your building has achieved its target reduction by the time the event begins.
10. During events or tests, monitor the building's performance through EnerTrac.
11. Slowly ramp-up post event.
12. Remove the signage once the event is over and the building has resumed normal operation.
13. Due to the time sensitive nature of DR events, please direct any DR questions directly to NuEnergen representative.

Tenant Demand Response Strategies & Best Practices

Tenants can participate in the Demand Response event by pursuing the following strategies outlined below. Refer to Appendix K for resources to distribute to tenants before and during a Demand Response Event.

Office

- **Tenant Controlled A/C Units:** Raise thermostats by 2°F at the set time and every 30 minutes after. Avoid sudden changes to prevent energy spikes.
- **Lighting:** Turn off unnecessary lights in offices and break rooms.
- **Office Equipment:** Power down non-essential devices like extra monitors, printers, kitchen appliances, and unused electronics. Use battery power for laptops if possible.

Residential

- **Tenant Controlled A/C Units:** Turn up thermostats two degrees at the time indicated and every half-hour thereafter up to 78 degrees. Note: Ramping up/down suddenly may cause the A/C unit to draw more power.
- **Lighting:** Switch off as many lights in the apartment and common areas as reasonably possible.
- **Residential Appliances:** Switch off coffee machines, microwaves, toasters, and instant hot water dispensers, water coolers, fans, heaters, unused computers or video game consoles, televisions, monitors, and other non-essential loads.

Tenant Energy Efficiency Strategies

Tenant energy use directly affects building performance. ESRT collaborates with tenants to improve energy efficiency and ROI by tracking energy reduction across buildings and tenant spaces. These efforts lower utility costs and support healthier workplaces. Our High-Performance Design and Construction Guidelines set strict standards to enhance energy efficiency and sustainability from the design phase onward. (Refer to Appendix F).

Tenant Energy Efficiency Programs

- **NYSERDA Commercial Tenant Program (CTP):** CTP help cover the cost of hiring qualified consultants to conduct energy audits, identify savings opportunities, and plan energy efficiency upgrades in tenant spaces. Tenants can engage consultants at any stage of the lease, including design, renovation, or occupancy, to reduce energy costs and improve occupant wellness and comfort.
- **Energy Star for Tenant Spaces:** Energy Star for Tenant Spaces is a program that demonstrates tenants' commitment to energy efficiency through energy and meter use estimations, efficient lighting and equipment, and data transparency.
- **ULI Tenant Energy Optimization Program:** The Tenant Energy Optimization Program integrates energy efficiency into tenant space design and construction and delivers financial returns through energy conservation.

Tenant Fit Out Alignment

This policy is aligned with ESRT's High Performance Design and Construction Guidelines. For information regarding energy efficiency requirements in tenant spaces. (Refer to Appendix F).

Ongoing Monitoring and Evaluation

The following metrics shall be tracked and reported on a quarterly, bi-annual, or annual basis to ensure compliance with the Energy and Greenhouse Gas Emissions Management Plan:

- Energy Consumption Metrics:
  - Total building energy consumption (electricity, fuel, district steam, natural gas)
  - Tenant direct energy consumption
  - Tenant sub-metered energy consumption (if available)
- Greenhouse Gas Emissions: Scope 1 and Scope 2
  - Total energy use intensity (energy use/sq. ft)
  - Energy and GHG Emissions Performance over time (% change against previous year)
- Energy Conservation Measures (Refer to Appendix I for Energy Conservation Project Tracking Log.
- Establish criteria to prioritize assets for further investigation.

Resources

ENERGY STAR

- ENERGY STAR Portfolio Manager: https://portfoliomanager.energystar.gov/pm/home.html
- ENERGY STAR Certification: Top 8 Reasons to Pursue ENERGY STAR Certification | ENERGY STAR
- ENERGY STAR For Tenants: ENERGY STAR Tenant Space | ENERGY STAR
- ENERGY STAR Guide to Energy Management: ENERGY STAR Guidelines for Energy Management

Capital Upgrade & Retrofit Financial Incentives:

- ConEdison
- NYSERDA

Renewable Energy Supply & Local Laws

- New York State Power to Choose program – Search by zip code, then look for suppliers with a "Green Offer."
- Con Edison Solutions Renewable Energy Information Page
- NYSERDA Clean Energy Standard
- NYSERDA Load Serving Entities Obligations
- NYSERDA CES 2022 Compliance Year and Renewable Energy Credit (REC)Zero Energy Credit (ZEC) Purchases:
    - Clean Energy Standard (CES) - NYSERDA
    - Compliance - NYSERDA
    - 2024 Compliance Year - NYSERDA
- Green-e – a third-party certifier recommended by the US Department of Energy, verifying that renewable energy and carbon offset products offered by suppliers meet their carbon reduction claims
- NYC Carbon Challenge
- Tenant Resources
    - ULI Tenant Energy Optimization Program
    - NYSERDA Commercial Tenant Program:
    - Energy Star for Tenants
- ClimateMobilizationAct_Brief.pdf
- Energy Grades - Buildings

WATER MANAGEMENT POLICY

Context

Water conservation reduces energy use, lowers operating costs, and mitigates supply risks. ESRT promotes water efficiency across all existing assets through initiatives like ultra-low fixtures and sustainable cleaning and landscaping practices.

Objectives

Frequency	Goal	Portfolio Manager	Property Manager	Building Engineer	Sustainability Team
Ongoing	Standardize water usage metrics and reporting cycle across all assets	✓			✓
	Baseline water usage by leveraging meter data, Wint and other resources to inform water usage performance targets for all assets	✓	✓	✓	✓
Annual	Comply with local and national regulatory requirements		✓	✓	✓
	Report whole-building water usage across all assets monthly and in real time with Wint.		✓	✓	✓
	Ensure whole-building water usage is equal to or less than the water usage from the prior year.		✓	✓	✓

Responsibility

It is the responsibility of **Portfolio Managers, Property Managers, Building Engineers, and Sustainability Team** to be familiar with the procedures and strategies in this policy and, where feasible, implement necessary improvements.

Asset-Level Requirements

Part I: Baseline

To implement the Water Management Policy, it is first necessary to understand the factors contributing to asset water usage performance.

- Obtain readily available water usage information:
  - Identify all current sources and end uses of potable water at the building, including municipally supplied potable water and any reclaimed stormwater.
  - Identify any needed upgrades to water meters or install water meters across all assets. Ensure the upgrades include the installation of Wint for real-time water submetering and monitoring.
  - Obtain basic information about water bills, account numbers, water meter numbers, and metering location.
  - Ensure whole-building water usage is being entered into the asset's ENERGY STAR Portfolio Manager (ESPM) profile.
  - Identify any data coverage gaps (e.g., tenants have their own account)
  - Use smart meters to identify potential leaks, monitor water use, analyze water use trends, and abnormal consumption trends in real time.

- Inventory Fixtures: Complete an inventory of all currently installed water fixtures, equipment, and portable water using systems, including flow/flush rates, to help identify opportunities for savings. Identify any recent upgrades.
    - Sources may include as-built drawings, renovation records, and maintenance receipts. Flow rates of undocumented fixtures may need to be calculated in field.

Part II: Performance

- **Set and track towards performance goals:** Use ENERGY STAR Portfolio Manager to benchmark and track whole-building water use quarterly. Leverage Wint (where installed) and Portfolio Manager to spot high-use areas, detect leaks, and identify conservation opportunities.
- **Keep ENERGY STAR Portfolio Manager profile updated:** Ensure the profile for the building is up to date with current usage, occupancy, floor area and schedule data.
- **Fix identified leaks:** Reduce water losses by addressing any identified drips or leaks and valves which may not be 100% tightly closed.
- **Install high efficiency low-flow fixtures or retrofit low-flow aerators/fixtures where appropriate and feasible.** *See low flow plumbing fixture specifications in the Strategies and Guidance section below.*
    - Retrofit projects will require additional study to determine feasibility, payback, etc.
- **Ensure water conservation best practices are in place.** *See the Strategies and Guidance section below*.
- **Evaluate progress and form water management plan:** Review tracking results to identify performance trends. Establish and revise an action plan to improve performance and implement.
- **Engage and educate tenants:** Share water-saving tips through guidelines, fact sheets, and emails. Offer annual or bi-annual training, which can be combined with energy or waste education. Use elevator screens to display fun facts and conservation tips.

Strategies and Guidance

Water Conservation Best Practices

To reduce potable water consumption, the following actions are recommended:

Compliance

- Exceed local and national regulations as applicable including but not limited to:
    - United States Energy Policy Act of 1992 (Epact 1992): Established uniform standards for water fixtures to promote conservation by residential and commercial water consumers.
    - Local water conservation regulations: See the Resources section below for information on NYC and state-specific water regulations.
    - ESRT requirements exceed code requirements with a target of over 40% better than code and WaterSense fixtures.

Metering

- Read water meters monthly and compare it to the same month last year to detect leaks and track conservation.
- Log data into ENERGY STAR Portfolio Manager or a third-party platform for benchmarking.
- Install submeters for key water-using systems (e.g. domestic hot water, irrigation system, cooling tower, boiler makeup, etc.) where feasible
    - Submeters help track usage by end use, identify leaks, and target efficiency improvements.

- If the property has an automated building management system (BMS or BAS), integrate all meters and submeters to enable automated tracking, alerts, and detailed reporting.

Leaks

- Use smart meters to identify potential waste and leaks, monitor water use, analyze water use trends, and identify abnormal consumption trends in real time.
- Check for leaks. Survey tenants to identify units with potentially faulty or leaky plumbing fixtures.
    - A leaking toilet or dripping faucet or showerhead can waste up to 1,000 gallons of water per week.

Site Maintenance

- Discontinue or minimize using potable water to clean paved areas. Instead of hosing entrances, sidewalks, parking lots and loading docks, sweep or use a blower to clean these areas.
- Review landscaping and irrigation system practices for opportunities to conserve water.
- Detect and repair all leaks in irrigation systems. Make sure the installed system is watering the intended landscaping—not the street or sidewalk.
- Water landscaping during the coolest part of the day to reduce evaporation.
- Program irrigation systems to automatically shut off when it's raining.
- Switch to a low-water intensity irrigation and landscaping system where feasible (e.g. drip irrigation, rainwater harvesting, xeriscaping). This may require additional study to assess feasibility, cost, etc.

Retrofits/Renovations

- When installing or replacing plumbing fixtures in common or tenant areas, ensure they meet the standards of ESRT's High Performance Guidelines or NYC Plumbing Code. All showerheads, private lavatory faucets, and urinals must be EPA WaterSense labeled.
- When replacing or installing new common area or tenant space dishwashers, washers, dryers or any other appliance, select ENERGY STAR rated appliancest.

Low-Flow Water Fixture Specifications

Ensure the following minimum performance requirements are met when upgrading/replacing the following indoor plumbing fixtures and fittings:

- Common Area, Amenity Area, and Tenant fit-out plumbing fixtures: In accordance with the High-Performance Design and Construction Guidelines, the maximum flush/flow rates for all new or upgraded fixtures within dwelling units shall not exceed the following:
    - Specify WaterSense fixtures for all toilets, urinals, private lavatory, faucets and showerheads
    - Water closet rate: 1.0 gallons per flush (gpf)
    - Urinal flow rate: 0.125 gpf
    - Pantry sink flow rate: 1.0 gallons per minute (gpm) and include specification for an aerator
    - Lavatory faucet flow rate: 0.25 gpm
    - Shower flow rate: 1.5 gpm

Ongoing Monitoring & Evaluation

Water performance should be evaluated on an ongoing basis to ensure year-over-year water consumption is decreasing.

Key Performance Metrics:

- Water consumption (gallons, kgal)
- Water use intensity (kgal/ft2)
- Water performance over time (% change against previous year)

Resources

WaterSense:

- WaterSense at Work: Best Management Practices for Commercial & Institutional Facilities
- WaterSense Labeled Products

ENERGY STAR Certified Products: https://www.energystar.gov/products/products_list

Water Usage Regulations:

- New York City Plumbing Code – Water Supply rates (See table 604.4 on page 4): https://www1.nyc.gov/assets/buildings/apps/pdf_viewer/viewer.html?file=2014CC_PC_Chapter6_Water_Supply_and_Distribution.pdf&section=conscode_2014
- National Efficiency Standards for Residential & Commercial Water Fixtures
- Water Efficiency Management Guide Residential Kitchen and Laundry
- https://www.epa.gov/sites/default/files/2017-10/documents/ws-commercialbuildings-waterscore-residential-kitchen-laundry-guide.pdf
- State-Specific Water Quality Standards Effective under the Clean Water Act (CWA) | US EPA

SUSTAINABLE WASTE MANAGEMENT POLICY

Context

According to the U.S. Environmental Protection Agency (EPA), the average person produces around 4.9 pounds of landfill waste per day. When waste is not disposed of properly, waste can be sent to landfills, which results in increased greenhouse gas emissions, and contaminates natural resources. In New York City, the commercial sector is comprised of 250,000 businesses and generates 9,000 tons of waste daily.[1]

New York City has established a stringent zero waste target to reduce waste by 90% by 2030. To achieve this goal, the NY Department of Sanitation (DSNY) has implemented waste and recycling regulations for commercial properties to help minimize waste and increase recycling rates.

ESRT is committed to minimizing the impact of the waste we generate through recycling and composting at our properties and recycling tenant waste and construction debris throughout our portfolio.

Objectives

Frequency	Goal	Portfolio Manager	Property Manager	Custodial Staff or Contractor	Sustainability Team
Annual	Ensure compliance with DSNY Waste & Recycling Regulations or other local recycling regulations as applicable.	✓	✓	✓	✓
	Reduce the amount of waste generated at each asset		✓	✓	✓
	Collect and divert recyclables from the landfill		✓	✓	✓
	Collect and divert 75-90% of construction waste from the landfill		✓	✓	✓
	Collect and divert organics material where feasible		✓	✓	✓
	Track and report waste metrics at all assets.	✓	✓	✓	✓
	Perform waste audits at select lower-performing properties to characterize waste stream and identify opportunities for improvement		✓	✓	✓
	Educate and engage tenants on proper waste and recycling practices		✓	✓	✓

[1] "About DSNY." About DSNY. http://www1.nyc.gov/assets/dsny/about/inside-dsny.shtml.

Responsibility

Property Managers, Tenant Services Coordinators, Custodial Teams, Contractors, and the Sustainability Team are responsible for understanding and applying the best practices in this plan. Property Managers and Tenant Services Coordinators should also share this policy and related resources with tenants to support compliance.

Asset-Level Requirements

To implement the Sustainable Waste Management Policy, the steps below outline the requirements for the Property Managers, Custodial Staff, Tenants and any third-party waste vendors to improve waste diversion:

- Comply with all local waste and recycling regulations
- Provide clearly labelled bins for trash, paper, plastic/metal/glass recycling bins
- Provide clearly labelled bins in the loading dock for trash, paper, plastic/metal/glass recycling bins
- Install educational signage to identify appropriate items for each waste stream
- For NYC properties, install waste decal from the Business Integrity Commission (BIC) to identify single stream or source separated recycling methodology.
- Educate and engage tenants in proper waste and recycling practices that align with the building's overall recycling collection methodology.

Part I: Baseline

1. Review a minimum 12 months of waste reports showing total weight generated and diversion percentage for each waste stream.
2. Conduct a quarterly or at minimum annual waste stream audit to establish current waste generation, diversion and contamination rates.

Part II: Performance

1. Conduct a walkthrough: Survey existing building waste storage and collection processes to identify opportunities to increase efficiency, improve waste diversion rates, and reduce contamination. Refer to Appendix N.
    a. Ensure bins are correctly colored, easily accessible, and adequately sized to meet the needs of the building.
    b. Install updated bin labels and signage in all waste and recycling collection rooms.
    c. Establish a collection area for e-waste and hazardous waste, as well as a management plan for proper disposal to ensure these materials do not contaminate the trash or recycling streams.
    d. Ensure any tenants participating in compost programs have the appropriate bins and signage
    e. *See the Resources section below for DSNY recycling and organics signage, as well as e-waste and hazardous waste information.*
2. Ensure building is enrolled in relevant local waste diversion programs including:
    a. DSNY Organics Collection Program
    b. Re-Fashion NYC (for textile recycling for applicable tenants as necessary)
    c. Lamp (bulb) recycling program
    d. Electronic Waste
    e. Furniture Donation
    f. Refer to the Resources section below for additional information and enrollment forms.
3. Record waste and diversion data monthly and consult your hauler as needed. At least annually, review waste and recycling programs to identify improvements. Conduct a waste audit every 1-2 years to compare against past data and guide corrective actions.
4. Educate employees, property management teams and custodial staff:

a. Provide training in Sustainable Waste Management policy.
b. Host annual training courses to provide information on waste and recycling strategies and best practices for all ESRT employees and property management teams.
c. Train custodial staff on proper waste and recycling procedures annually.

5. Educate tenants:
   a. Provide guidelines or one-pagers to tenants on waste reduction and recycling tips
      i. Tenant Waste Management Guide.
   b. Host annual trainings during Tenant Town Halls for all tenants on waste, recycling and composting.
   c. Include digital signage on Captivate Screens highlighting the benefits of recycling and best practices

Strategies and Guidance

Refer to the below for Strategies and Guidance to promote sustainable waste management practices.

Waste Stream Types

Ongoing Consumables: Ongoing consumables refer to low cost-per-unit materials that are regularly used and replaced throughout the daily course of business and include at a minimum paper, toner cartridges, binders, notebooks, envelopes, batteries, desk accessories, etc.

- Properties shall aim to reuse/recycle or compost at least 50% by weight of total ongoing consumables waste wherever feasible.
- Properties should divert 100% of discarded batteries and toner cartridges from entering landfills wherever feasible.

Durable Goods: In addition to ongoing consumables waste management, ESRT requires that properties dispose of durable goods, including furniture and appliances in a sustainable manner, including donation and other available local waste diversion programs as applicable. For any ESRT property that would like to donate abandoned furniture and appliances instead of disposing them, property teams should complete the following steps:

- Step # 1 – The Property Manager or her/his/their designee will email the attached inventory form to the HR and Sustainability Teams including photos of all the items that are being donated.
- Step # 2 – Once the request has been received by the HR and Sustainability Teams, they will review and find a charitable organization for this donation.
- Step # 3 - The HR and Sustainability Teams will then follow up with the Property Manager or her/his/their designee 5-10 business days from the requested date and introduce the Property Manager or her/his/their designee to the charitable organizations point of contact that our committee has chosen for that donation to coordinate the donation pick up
- Step # 4 – The Property Manager or her/his/their designee will partner directly with the partner charitable organization's point of contact in respect to logistics, COI, date/time of pick up etc.
- Step # 5 – On the day of the scheduled pick up, the chosen charitable organization will then provide the Property Manager or her/his/their designee a Donor's Official Receipt. It is up to the Property Manager or her/his/their designee's responsibility to make sure they receive the receipt.
- Step # 6 - Once the Property Manager or her/his/their designee receives the receipt from the charitable organization, the Property Manager or her/his/their designee is then asked to scan/email this receipt to the Accounting Department and Legal department and to the HR and Sustainability Teams.

Electronic Waste: Electronic Waste (E-Waste) must be collected and disposed of separately from trash and recycling. Each office property offers complimentary e-waste pickup quarterly with an approved electronic waste recycler who is either an e-steward or R-2 certification to ensure that electronics. If donation is not an option, the building should contract an approved electronic waste recycler. When choosing a recycler, look for e-stewards or R2 certification to help ensure that your electronics are recycled responsibly. Refer to the Resources Section of the NYS Department of Environmental Conservation for a list of registered recyclers.

Organics Waste: Organic waste can be diverted from the landfill through compost, where possible. Encourage tenants to participate in an organics collection program if current infrastructure exists to support compost collection at the building. Appropriate signage and bins should be installed and provided as necessary. Compost is the decomposition of organic materials into soil or fertilizer. Organic material includes fruits, vegetables, pasta, bread, meat, and even some paper products, which break down and enrich soil, reduce erosion, and help reduce greenhouse gas emissions.

Collection Methodology

Determine the collection methodology for your building, whether it is source-separated with (3) bins, one for trash, one for plastic/metal/glass, and one for paper. Alternatively, if you have single stream recycling, you have (2) bins, one for trash, and one for plastic/metal/glass/paper. Refer to Appendix P for NYC Waste & Recycling Collection Methodologies

Bins & Signage

Base Building:

- Wherever there is a trash bin, provide paper, plastics/metals/glass, and where applicable, a compost bin. These should be present on all tenant floors and in tenant spaces where ESRT manages waste and recycling.
- Educational signage and bins should be color coordinated for each waste stream. It is recommended that bins follow the colors used by the local municipal waste authority/regulator. Educational signage should be placed near all bins. Refer to Appendix M for sample waste and recycling signage.
- Assign a schedule for custodial staff to check, empty, and log bin activity. Adjust bin size or check frequency based on how full bins are during checks.
- A decal from the NYC Business Integrity Commission (BIC) should be displayed on the exterior of the building that indicates the days of pickup for recycling and trash and maintain a written recycling agreement with your hauler(s) for a separate collection of recyclables.

Loading Dock:

- The loading dock should have appropriate space for bins that correspond to the building waste collection stream, either source separated or single stream recycling. There should be a dumpster/bin for each waste stream and a label on each bin.
- There should be appropriate educational signage located above the bins to indicate which bin is for each waste stream.

Waste Audits

- Conduct a waste audit annually: Identify opportunities to improve diversion, reduce contamination, and minimize waste at the source
- Based on waste audit findings, reevaluate the existing waste and recycling program of the office and implement changes to the program where necessary.

- Waste audits can either be conducted internally, by the waste hauler, or by another third-party waste auditor.

Tenant Strategies & Best Practices

All tenants are required to recycle. Refer to the following Checklist to implement a recycling program.

- You must source separate paper, plastic/metal/glass containers, and cardboard. If you generate a large amount of fabric or construction materials, refer to the Resources section for further guidance.
- Install bins for trash, plastic/metal/glass, and paper. Provide enough containers to satisfy waste and recycling needs.
- Install appropriate labels/bin decals on each bin and corresponding signage to indicate which material should go into each bin. Signage should be prominently placed in all common areas such as pantries, copy rooms, and meeting rooms. Refer to Appendix M for Waste & Recycling Signage.
- If you employ your own custodial staff, ensure recyclables are placed in clear bags.
- If you contract your own waste hauler or have a street level business, you must prominently display a hauler decal from the New York Business Integrity Commission (BIC) that indicates the days of pickup for recycling and trash and maintain a written recycling agreement with your hauler(s) for separate collection of recyclables.
- All of the following materials should NOT be placed in the trash included. However, if you need to dispose of these materials, contact the Property Management Team for more information.
    - Electronic
    - Bulk Metal
    - Universal Waste: Bulbs, Batteries, Ballasts
    - Hazardous Waste
    - Textiles

Bin Setup

- Consider removing individual desk bins to reduce total bin count and encourage mindful waste practices. Centralized collection areas are more efficient and discourage unnecessary waste.
- Ensure recycling bins are always installed adjacent to trash bins.
- Ensure bins are strategically placed in areas where occupants frequent on a consistent basis, including pantry, open office spaces, copy rooms, meeting rooms, etc.
- Use consistent bins, labels, and signage throughout the office to reduce confusion and streamline waste sorting.

Bags

If you provide your own bags to cleaning staff, please ensure:

- Recycling must be in clear bags so that the contents can be seen and recovered
- Trash must be in opaque or black bags to facilitate differentiation between trash and recycling
- Organics must be placed in green/compostable bags or placed loose in the receptable (hauler dependent)
- Consider purchasing eco-friendly trash and recycling bags for your space, that are made of recycled content. Refer to Resources for more information on specific bags to purchase.

Tenant Fit-Out Alignment

This policy is aligned with ESRT's High Performance Design and Construction Guidelines. For information regarding waste and recycling requirements in tenant spaces, see Appendix F High-Performance Design and Construction Guidelines.

Waste Reduction Best Practices for Buildings & Tenants

The strategies below are aimed at two objectives: first, to decrease unnecessary waste from being generated, and second, to increase the amount of waste that is successfully recycled.

- Use strategic purchasing decisions to reduce waste generation and environmental impact.
  - Purchase only what is necessary.
  - Purchase non-perishable ongoing consumables in bulk to reduce excess packaging.
  - Purchase products that are recyclable, rather than products that do not contain recyclable materials.
  - Purchase products made from recycled content, rather than products made from new materials (e.g., recycled paper over virgin paper).
  - Purchase products that are reusable, rather than single-use products.
  - Purchase electronic products and batteries that are rechargeable, rather than disposable batteries.
  - Minimize disposable packaging materials coming to the building (e.g., pallets, non-reusable containers) and prioritize distributors or partners that offer minimal and/or reusable packaging solutions and offer Extend Producer Responsibility or product take-back programs.
  - Purchase and use reusable clothes, rather than paper towels.
  - Print double-sided to reduce paper and energy consumption.
  - Do not purchase Styrofoam.
  - Provide reusable cups, plates, and silverware to reduce the use of single-use plastics.
  - Bring a reusable bag to pick up lunch.
  - Bring a reusable cup to purchase coffee and other beverages outside the building.
  - Adhere to the ISO 20400: 2017 Sustainable Procurement-Guidance.

Ongoing Monitoring & Evaluation

- **Waste Audits:** Perform waste audits annually at each asset. Collect and review reports from waste audit vendors.
- **Engagement**
  - Train property trams annually via ESRT Sustainability University on policy and best practices.
  - Educate tenants annually at Town Halls to boost recycling awareness and rates
  - Engage third-party vendors and waste haulers to ensure waste reports are provided on a regular basis.
- **Key Performance Metrics:** Track and report key performance metrics quarterly/annually to ensure compliance with the Sustainable Waste Management Policy. Metrics to be provided by Great Forest and/or the waste hauler. Refer to Appendix O.
  - Weight of landfill waste at each asset
  - Weight of diverted waste per asset. Diverted waste must be reported by waste type wherever feasible and align with the waste collection method at the building.
    - Paper
    - Cardboard
    - Plastic/Metal/Glass
    - Organics
    - Electronics/Appliances (E-Waste)
    - Furniture and other Durable Goods

$$diversion\ rate\ (\%) = \frac{(weight\ of\ recycling) - (weight\ of\ contamination\ in\ recycling)}{total\ weight\ of\ waste}$$

Resources

1. DSNY Recycling Regulations and Guidelines: https://www.nyc.gov/site/dsny/collection/residents/recycling.page
2. Commercial Organics Requirements: Commercial Organics Requirements - DSNY
3. Residents Curbside Composting Program: Curbside Composting - DSNY
4. Organics Collection: organics-collection-instructions-english-arabic-twice-a-week-pickup-ocf-ea2.pdf
5. NYS Department of Environmental Conservation Registered Electronic Recyclers List: http://www.dec.ny.gov/chemical/73670.html
6. DSNY "What to Recycle" List: Recycling - DSNY
7. NYC Official Recycling Signage and Materials (PDFs can be downloaded for free): https://dsny.force.com/recyclingmaterialsrequest/s/?language=en_US&parameter=JmF1ZElkPWEyQjZnMDAwMDAwcHN4ekVBQSZvbGRBdWRJZD1hMkI2ZzAwMDAwMHBzeHpFQUEmc2VsZWN0ZWRDYXRlZ29yeUlkPWEyQzZnMDAwMDAxVVVxQ0VBVyZvcmRlckluZm89e30mc2hpcHBpbmdJbmZvPXt9JnBhZ2VOYW1lPWNhdGVnb3J5
8. NYC Official Recycling Signage and Materials for Residents 10+ Units: https://dsny.force.com/recyclingmaterialsrequest/s/?language=en_US&parameter=JmF1ZElkPWEyQjZnMDAwMDAwcHN4d0VBQSZzdWJBdWRJZD1hMkI2ZzAwMDAwMHBzeTdFQUEmb2xkQXVkSWQ9YTJCNmcwMDAwMDBwc3h3RUFBJm9sZFN1YkF1ZElkPWEyQjZnMDAwMDAwcHN5N0VBQSZvcmRlckluZm89e30mc2hpcHBpbmdJbmZvPXt9JnBhZ2VOYW1lPWNhdGVnb3J5 https://materials.bwprronline.org/home
9. Re-Fashion NYC Program Overview: https://www.housingworks.org/donate/re-fashionnyc
10. Re-Fashion NYC Application: Textile Recycling Collection - DSNY
11. NYC Harmful Product Recycling Guidance (Includes Fluorescent Bulbs, Batteries, etc.): Safe Handling & Disposal of Harmful Products
12. NYC Bulk Collection Program (including furniture): Large Items - DSNY
13. Bags with Sustainability Criteria
    - Pitt Plastics (LEED-Specified): http://www.pittplastics.com/
    - Aluf Plastics (LEED-Specified): https://www.alufplastics.com/
    - BioBag: http://biobagusa.com/

INDOOR ENVIRONMENTAL QUALITY POLICY

Context

ESRT is committed to enhancing the health and wellness of our building occupants through the implementation of proper, cost-effective indoor environmental quality (IEQ) practices and procedures. This includes managing our facilities in a way that protects human health and the surrounding environment and improves economic returns through the most effective, least risk option. This policy applies to all existing ESRT assets and any new construction and major renovation projects.

Objectives

Frequency	Goal	Portfolio Manager	Property Manage	Property Maintenance	Sustainability Team
Ongoing	Achieve minimum ventilation requirements at all facilities	✓	✓	✓	✓
	Implement Integrated Pest Management (IPM) practices at all facilities	✓	✓		✓
	Implement a smoke-free environment standards and procedures at all facilities	✓	✓		✓
	Implement green cleaning standards and procedures at all facilities	✓	✓		✓
	Conduct annual Indoor Air Quality Surveys that test for: Carbon Dioxide (CO_2), Carbon Monoxide (CO), Airborne Particulates, Temperature/Relative Humidity, Total Volatile Organic Compounds (TVOCs).		✓		✓
As needed	Ensure tenant fit-outs meet ESRT High Performance Design and Construction Guidelines		✓	✓	✓
	Ensure all maintenance and project activities utilize no or low-VOC products		✓	✓	✓
	Install particulate matter filters or air cleaners with a minimum efficiency reporting value (MERV) of not less than 13 at all facilities		✓	✓	✓
	Install CO_2 – based demand control ventilation (DCV) sensors at all facilities		✓	✓	✓

Responsibility

Portfolio Managers, Property Managers, Director of Custodial and Custodial Staff, Tenant Services Coordinator, Pest Management Vendors and On-Site Staff shall ensure that the procedures and strategies are implemented at each property.

Asset-Level Requirements

All assets should align with I-BEAM Operations & Maintenance (EPA I-BEAM Periodic IAQ O&M)

Part I: Minimum Ventilation Requirements

- Ensure the ventilation system equipment and associated components are regularly serviced and maintained as per Table 8.2 of ASHRAE 62.1-2016 (See Appendix A for ASHRAE Ventilation System Maintenance Checklist).
    - Collect and review existing equipment records – including system-specific operating documents, and check HVAC maintenance records against equipment lists. Ensure the filter maintenance and cleaning schedule is being followed and up to date for all common area air handling units. Ensure ventilation supply, exhaust, grilles, and louvres are not blocked.
- Measure the total quantity of outdoor air delivered and verify the results for all spaces comply with the rates outlined in Table 6.2.2.1 of ASHRAE 62.1-2016 (See Appendix B for ASHRAE Minimum Ventilation Rates in Breathing Zone) or Table 403.3 in New York City Mechanical Code (See Appendix C for New York City Minimum Ventilation Rates), whichever is more applicable and more stringent. Conduct inspections and testing on all HVAC equipment and rooftop units that supply outdoor air to common areas to ensure that they continue to provide their design ventilation airflow rates, and these rates meet or exceed the minimum required as per ASHRAE 62.1-2016, Sections 4-7
    - When appropriate, retrofit the building management system (BMS) dampers and demand-controlled ventilation (DVC) system to manage the building's overall outside air intake, balancing IEQ with energy efficiency. This energy conservation measure (ECM) should be implemented if the building is already meeting the ASHRAE 62.1 standard or New York City Minimum Ventilation Rates
- Conduct annual indoor air quality testing for carbon monoxide (CO), carbon dioxide (CO2), airborne particulates, volatile organic compounds (VOCs), temperature/relative humidity, and a visual inspection of each location. This can be completed by the building engineer or through a third-party air quality testing vendor. The purpose of annual testing is to:
    - Establish a baseline for air quality performance if one has not been established
    - Ensure indoor air quality conditions are assessed for all representative locations
    - Between annual testing, utilize BMS CO2 and OA sensors to monitor air quality. Immediately address any potential IEQ concerns.
    - Immediately address any potential IEQ concerns

Part II: Pollutant Control

- Implement environmental tobacco smoke (ETS) restrictions and ensure compliance of building staff, tenants and visitors to minimize the effects of ETS on building occupants
    - See Strategies and Guidance for ETS protocols
- Implement an integrated pest management (IPM) plan and ensure compliance with pest management vendors and building staff. Utilize a pest management contractor that is certified by GreenPro, EcoWise, GreenShield, or local equivalent
    - See Strategies and Guidance for IPM protocols
- Implement green cleaning program and ensure compliance of cleaning vendors and custodial staff
    - See Strategies and Guidance for Green Cleaning Protocols
- Utilize low-VOC products when performing maintenance or painting touch-ups
    - See Strategies and Guidance for the emission limits and requirements for various product types
- Ensure tenant fit-outs meet or exceed High Performance and Design Construction Guidelines as outlined in the ESRT Guidelines

- Install particulate matter filters or air cleaners with a minimum efficiency reporting value (MERV) of not less than 13, Replace filters annually and pre-filters quarterly.
- Install CO_2 – based demand control ventilation (DCV) sensors

Strategies and Guidance

Indoor Air Quality Monitoring

As part of ESRT's overall commitment to ensuring good Indoor Air Quality is implemented across the portfolio, ESRT requires that all properties conduct an annual Indoor Air Quality Survey conducted by a third-party vendor that tests Carbon Dioxide (CO_2), Carbon Monoxide (CO), Airborne Particulates, Temperature/Relative Humidity, and Total Volatile Organic Compounds (TVOCs). Testing should occur in sample-representative locations. IAQ tests should be conducted at a minimum of once annually. IAQ tests should be provided to Property Manager and Portfolio Managers upon completion from third-party vendors. If corrective action is needed, employ the pollutant control measures outlined in Part II: Pollutant Control.

Demand Control Ventilation

CO2-based demand-controlled ventilation refers to the practice of using carbon dioxide concentrations as an indicator for the per-person ventilation rate. CO2 sensors are to be placed in:

- densely occupied areas: monitors shall be between 3 and 6 feet above the floor in open office areas
- return air stream to the Air Handling Unit serving space: monitors shall tie into controls including an air-side economizer and automatic modulating control of the outdoor air damper

Source Control Management of pollutant sources and moistures are ongoing operations to maintain indoor air quality during occupancy.

Manage pollutant sources through

- properly sealing doors, floors and windows
- regularly checking for and eliminating mold
- installing appliances so that they vent to the outside
- diluting and removing pollutants through ventilation
- Using filtration to clean the air

Manage moisture through

- Using moisture tolerant materials
- Setting up systems to divert water away from the building

Implement a building-wide smoke free policy

Particulate Matter Filtration

Particulate matter filters or air cleaners having a minimum efficiency reporting value (MERV) of not less than 13 when rated are to be used upstream of all cooling coils or other devices through which air is supplied to an occupiable space.

Mold & Moisture

- Onsite engineers inspect weekly for signs and potential sources of water damage or pooling, discoloration and mold on ceilings, walls, floors, and HVAC equipment. We have advanced leak detection systems in all mechanical rooms for HVAC equipment which alarm automatically to our BMS and send text alerts to our engineers
- Wint, water intelligence monitoring and alarm.
- HVAC specifications, standards, and sequence of operations include dehumidification and humidity monitoring to minimize risk. Formal inspections and reports are performed at every property at least annually
- Notification & Communication: Occupants and tenants can notify building management about mold or water damage (as well as any issue with temperature, comfort, other needs) in real time through our Workspeed notification program. Our occupants and tenants also have full access through email, mobile and physical offices to contact their property management and engineering teams.

Indoor Air Quality Control During Construction

Construction can pollute indoor air and contaminate HVAC systems with dust, VOCs, and other pollutants that may linger post-occupancy. To prevent this, a Construction Indoor Air Quality Management Plan must be implemented during work and before occupancy to limit pollutant spread. All onsite personnel must also follow OSHA PPE requirements. At a minimum, the plan should include:

- HVAC Protection
    - Avoid using permanently installed HVAC systems if possible. Use temporary systems where possible
    - Ensure noise and vibration from construction activities is mitigated.
    - If permanently installed air handlers are used during construction, filtration media must be used at each return air grille. Filtration must have a minimum efficiency of 30% or an arrestance of greater than 90%. Replace all filtration media immediately prior to occupancy
    - Store equipment in a clean, dry location. Protect ducts and equipment by sealing openings with plastic
    - Clean air plenums before use
    - Ensure all filtration media will be replaced prior to occupancy.
- Source Control
    - Avoid finish materials with high VOC and formaldehyde levels
    - Recover, isolate and ventilate as appropriate when using any toxic materials or creating exhaust fumes
    - All containers for paints, adhesives and sealants will be stored in a separate, secure location at times when construction is not active. During construction, lids will be kept on all containers as much as possible.
    - Protect stored on-site and installed absorptive materials from moisture damage. Do not install moisture-damaged materials unless they have properly dried.
    - Implement measures to avoid the tracking of pollutants into work areas and occupying portions of the building.
    - Ensure appliances and equipment are designed to vent outdoors.
- Pathway Interruption
    - Isolate areas to prevent contamination of clean or occupied spaces using physical separation and depressurization
    - Ensure the construction area will be ventilated using 100% outside air to exhaust contaminated air directly to the outside. Dust guards and collectors will be used on saws, sanders, and other tools.
- Housekeeping
    - Implement practices to ensure a clean job site to control potential contaminants such as dirt, dust and debris. All porous or absorptive building materials, such as dry walls and ceiling tiles, will be protected from

exposure to moisture and will be stored in a separate, clean area prior to installation. The entrances to the construction area will have temporary walk-off mats to collect particulates. The construction area will be sealed off using plastic.
    - During construction, daily housekeeping will include the use of vacuum cleaners with high-efficiency particulate filters and sweeping compounds or wetting agents for dust control when sweeping.
    - Prior to building material installation, the installation area will be cleaned to remove dust and debris.
    - Prior to occupancy, the construction area will be vacuumed using high efficiency particulate filters.
  - Clean up spills and keep work areas dry
- Scheduling
  - Coordinate construction activities after normal working hours to minimize disruption of occupied spaces
  - Carefully sequence construction activities to minimize IAQ issues
- Monitoring
  - Assign responsibility for monitoring of the IAQ Plan
  - Designate recurring site coordination meetings to ensure the appropriate components of the IAQ Management Plan are reviewed and followed
- Flush-out and/or Testing
  - At the owner's discretion, the finished space may be flushed out to remove the remaining contaminants, and/or tested to ensure satisfactory indoor air quality. Any assistance the owner requires for these operations will be the responsibility of the General Contractor as stated in the High-Performance Design and Construction Guidelines Section I. The flush out will begin after all construction work, including punch-list items, has been completed and furniture and fixtures have been installed. Finalize all cleaning, complete the final testing and balancing of HVAC systems, and make sure the HVAC control is functional. As stated in the Construction IAQ Management Plan,14,000 cubic feet per square foot of floor area will be delivered to the space, with an internal temperature of at least 60 degrees Fahrenheit and a relative humidity of no more than 60% where cooling mechanisms are operated. The area will not be occupied until at least 3,500 cubic feet of outdoor air per square foot has been provided to the space. After occupancy, the outside air will be ventilated at a minimum rate of 0.30 cfm per square foot.

Tobacco-Free and Smoke-Free Environment

The following protocols shall be enforced to minimize the effect of tobacco and smoke to building occupants:

- The use of tobacco, cannabis and controlled substances is prohibited in the building by all building occupants. This includes:
  - Cigarettes, cigars
  - Pipes, hookahs, water pipes
  - Electronic cigarettes and vaping devices
  - Nicotine products
  - Smokeless Tobacco including chewing, dipping, or any other use of tobacco products
- The use of tobacco, cannabis and controlled substances is prohibited in all outdoor areas, rooftops, and parking areas within the building site and within 25 feet of building entrances.
- Designated smoking areas are prohibited on the building site

Notifications: Communication of the no-smoking policy to occupants shall be demonstrated. Possible communication strategies include:

- No-smoking signage in and/or around facilities
- No-smoking section in lease agreements
- Email communication
- Verbal communication
- Memo to all building occupants
- Captivate screen messaging

Enforcement: Enforcement of the policy is expected to occur on a regular basis for all occupants and on an as-needed basis for any occupant found to be in violation of the policy with special focus within a radius of all property entryways.

Low-Emitting Materials

On-site products shall meet stringent requirements for no or low levels of VOCs, for the health of the installers and others who are exposed to these products and should align with LEED v4.1 and WELL v2 standards. To demonstrate compliance, a product or layer shall meet the following requirements, as applicable. Disclosure of VOC content must be made by the manufacturer. Any testing must follow the test method specified in the applicable regulation. On-site products shall not contain the worst in-class materials noted on the Living Building Challenge Red List. Red List Building Materials contain chemicals that have been designated as harmful to living creatures, including humans, or the environment.

Furniture

Sustainable purchases are those that meet one or more of the following criteria:

- GreenScreen v1.2 Benchmark. Products with fully inventoried chemical ingredients to 100 ppm with no Benchmark 1 hazards.
- Cradle to Cradle certified. Products purchased have earned Cradle to Cradle certification of any level, Version 3 or newer.
- Certified to UL GREENGUARD Gold (accepted for all categories' VOC emission requirements except
- Composite Wood)
- California Air Resources Board (CARB) requirements for ultra-low-emitting formaldehyde (ULEF)
- resins or no-added formaldehyde-based resins (Accepted for Composite Wood)
- EPA TSCA Title VI for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde
- resins (NAF) (accepted for Composite Wood)
- EPD Optimization path: Products with Environmental Product Declarations (EPDs) that are third-party certified and demonstrate impact reduction below industry average in at least three of the following categories:
    - global warming potential (greenhouse gases), in CO2e;
    - depletion of the stratospheric ozone layer, in kg CFC-11;
    - acidification of land and water sources, in moles H+ or kg SO2;
    - eutrophication, in kg nitrogen or kg phosphate;
    - formation of tropospheric ozone, in kg NOx, kg O3 eq, or kg ethene; and
    - depletion of nonrenewable energy resources, in MJ.
- Products must have been tested, following ANSI/BIFMA Standard Method M7.1–2011, and must comply with ANSI/BIFMA e3-2019 Furniture Sustainability Standard, Sections 7.6.1 (valued at 50% cost) or 7.6.2 (valued at 100% cost), using either the concentration modeling approach or the emissions factor approach.
- Product Manufacturer Supply Chain Optimization: Purchase products meet any of the following supply chain optimization criteria:

- Are sourced from product manufacturers who engage in validated and robust safety, health, hazard, and risk programs which at a minimum document at least 99% (by weight) of the ingredients used to make the building product or building material, and
- Are sourced from product manufacturers with independent third-party verification of their supply chain that at a minimum verifies:
  - Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation
  - Processes are in place to identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
  - Processes are in place to implement measures to manage health, safety and environmental hazard and risk of chemical ingredients.
  - Processes are in place to optimize health, safety, and environmental impacts when designing and improving chemical ingredients.
  - Processes are in place to communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain. Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain

- ANSI/BIFMA e3 Furniture Sustainability Standard: Documentation from the assessor or scorecard from BIFMA must demonstrate the product earned at least 3 points under 7.5.1.3 Advanced Level in e3-2014 or 3 points under 7.4.1.3 Advanced Level in e3-2012.

Paints, Coatings, Adhesives and Sealants

Sustainable purchases are those that meet one or more of the following criteria:

- Use products with a GreenGuard Gold certificate where possible (see Resources section below for example GreenGuard label).
- If GreenGuard Gold certified products are not available for a particular application, ensure that products used do not exceed VOC content limits.
  - All paints and coatings applied on site shall meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011. See the Resources section below for more information. Some common product VOC limits are:
    - Flat and Non-Flat Paints: 50 g/L
    - Primers: 100 g/L
    - Stains: 100 g/L
    - Waterproofing Sealers: 100 g/L
    - Wood Coatings (such as varnish, lacquer): 275 g/L
  - California Department of Public Health Standard Method V1.2 2017 (accepted for all categories' VOC emission requirements except Furniture and Composite Wood
  - EN16402 (accepted for Paints and Coatings VOC content requirements)
  - European Decopaint Directive (2004/42/EC) (accepted for Paints and Coatings, Adhesives and Sealants VOC content requirement
  - Canadian VOC Concentration Limits for Architectural Coatings (accepted for Paints and Coatings, Adhesives and Sealants VOC content requirements)

- All adhesives and sealants wet-applied on site shall meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168. See the Resources section below for more information. Some common product VOC limits are:
  - Carpet Pad Adhesive: 50 g/L
  - Ceramic Glass, Porcelain, & Stone Tile Adhesive: 65 g/L
  - Drywall & Panel Adhesive: 50 g/L
  - Multi-Purpose Adhesives: 70 g/L
  - VCT Tile Adhesive: 50 g/L
  - Wood Flooring Adhesive: 100 g/L
- If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) must be disclosed. If a product cannot reasonably be tested as specified above, testing of VOC content must comply with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2. Methylene chloride and perchloroethylene may not be intentionally added to paints, coatings, adhesives, or sealants.

Other Products

This applies only to building elements permanently or semi-permanently attached to the building itself. Examples include, but are not limited to, building components and structures (wall studs, insulation, doors, windows); panels; attached finishing's (drywall, trim, ceiling panels); carpet and other flooring material; adhesives; sealants; paints and coatings. Furniture, mechanical, electrical, plumbing components, and specialty items such as elevators are excluded. Sustainable purchases are those that meet one or more of the following criteria:

- Carpet and Rug Institute (CRI): Labeling program that identifies carpets, adhesives, and cushions that are tested by an independent, certified laboratory and meet stringent criteria for low chemical emissions
- UL GREENGUARD Gold certified for all products where applicable and practical
- Health Product Declaration (HPD). The end use product has a published, complete HPD with full disclosure of known hazards in compliance with the HPD Open Standard.
- Cradle to Cradle Certified. Products purchased have earned Cradle to Cradle certification of any level, Version 3 or newer.
- The Declare label must indicate that all ingredients have been evaluated and disclosed to 1000 ppm.
- Product Lens certification
- Facts - NSF/ANSI 336. Sustainability Assessment for Commercial Furnishings Fabric at any certification level
- Environmental Product Declaration (EPD): Products having an environmental product declaration that conforms to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope. The EPD can be either industry-wide (generic) EPD or product specific Type III EPD with third party external verification in which the manufacturer is explicitly recognized as the participant by the program operator.
- GreenScreen v1.2 Benchmark. Products with fully inventoried chemical ingredients to 100 ppm with no Benchmark 1 hazards.
- Cradle to Cradle certified. Products purchased have earned Cradle to Cradle certification of any level, Version 3 or newer.
- EPD Optimization path: Products with Environmental Product Declarations (EPDs) that are third-party certified and demonstrate impact reduction below industry average in at least three of the following categories:
  - Global warming potential (greenhouse gases), in CO2e;
  - Depletion of the stratospheric ozone layer, in kg CFC-11;
  - Acidification of land and water sources, in moles H+ or kg SO2;
  - Eutrophication, in kg nitrogen or kg phosphate;

    - Formation of tropospheric ozone, in kg NOx, kg O3 eq, or kg ethene; and
    - Depletion of nonrenewable energy resources, in MJ.
- Product Manufacturer Supply Chain Optimization: Purchase products meet any of the following supply chain optimization criteria:
    - Are sourced from product manufacturers who engage in validated and robust safety, health, hazard, and risk programs which at a minimum document at least 99% (by weight) of the ingredients used to make the building product or building material, and
    - Are sourced from product manufacturers with independent third-party verification of their supply chain that at a minimum verifies:
    - Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation
    - Processes are in place to identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
    - Processes are in place to implement measures to manage health, safety and environmental hazard and risk of chemical ingredients.
    - Processes are in place to optimize health, safety, and environmental impacts when designing and improving chemical ingredients.
    - Processes are in place to communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain. Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain

Green Cleaning

Maintaining property appearance is central to ESRT's tenant service. Property Managers are responsible for ensuring full compliance with the Property Cleaning Policy. Any property-specific differences should be addressed through supplemental documentation.

Implementing a green cleaning program is essential to reduce chemical, biological, and particulate pollutants that affect health and building operations. All building areas must use green cleaning techniques. Staff and vendors should apply the following methods as appropriate:

- Monitoring and Reporting: Property inspections are to be conducted quarterly with the Property Manager, Portfolio Manager, and SVP of Property Management. Bi-Weekly inspections with the cleaning consultant are to be scheduled on a property basis or more frequently as necessitated by the property.
- Notifications: The cleaning supervisor should always keep the property management office apprised of any issues via written and verbal communication. Should the cleaning of areas be delayed for any reason, the PM should be made aware immediately. Similarly, if any changes to daily cleaning due to construction or tenant activity occur, the cleaning manager should be made aware of the post-haste.
- Documentation: All Material Safety Data Sheets (MSDS) shall be always updated and made available.

<u>Green Cleaning Strategies</u>

- Assess all current cleaning products and equipment
- Request regular logs of cleaning purchases and equipment to ensure they meet sustainability criteria

- Use manual or electric-powered maintenance and cleaning equipment whenever possible to reduce the energy and water used by powered equipment and typical cleaning strategies.
- The filters in vacuums and other applicable equipment will be changed frequently to enable air flow and reduce the energy consumption of the equipment.
- Consider conducting a custodial effectiveness audit in accordance with APPA Leadership in Educational Facilities Custodial Staffing Guidelines, or local equivalent to ensure the building is operating in accordance with the Green Cleaning Program and assess the overall cleanliness

Protection for Vulnerable Occupants during Cleaning

- As much as possible, only sustainable cleaning products will be used that follow the green cleaning standards and product purchasing guidelines.
- Any cleaning that involves the use of carpet cleaners or any non-sustainable cleaning product will be performed after regular business hours.

Staff Training

- All custodial staff, including backup personnel, are required to attend training annually. Training covers the standard operating procedures of cleaning different surfaces, proper toxic chemical usage and spill management, hazards of toxic chemicals, cleaning to protect vulnerable occupants, cleaning equipment maintenance, conversation of energy and water usage during cleaning, how to properly wear personal protective equipment (PPE), and waste sorting and zero waste best practices.

Green Cleaning Standards Overview

- Green Seal: Green Seal provides science-based environmental certification standards that are credible, transparent and essential to help manufacturers, purchasers and consumers make responsible choices that positively impact business behavior and improve quality of life
- UL Ecologo: Certification is based on multi-attribute, lifecycle-based standard that assesses a product's environmental performance
- Design for Environment (DfE): Labelling program that identifies cleaning products demonstrated to be less damaging to human health and the environment, and applies to all purpose cleaners, dish soaps, hand soaps, odor removers, degreasers, metal cleaners and polishes, and bathroom cleaners
- Forest Stewardship Council (FSC): Labelling program that identifies wood products grown and harvested with responsible forest management practices
- EPA Safer Choice Standard: Safer Choice Standard comprises the requirements of products and their ingredients must meet to earn the Safer Choice Label. The Safer Choice Program has evaluated and determined these ingredients to be safer than traditional chemical ingredients used for the same function

Sustainable Cleaning Product Purchasing Guidelines

Supplies are to be procured from the ESRT designated janitorial supplier as specified through the competitive bid process. Each property should designate a supply storage area(s) and select a staff member to restock and inventory the supplies as necessary. All applicable and eligible products utilized in building maintenance shall meet one or more of the following standards:

Green Cleaning Products

- Green Seal GS-40 for industrial and institutional floor-care products

- Green Seal GS-37 for general purposes, bathroom, glass, and carpet cleaners used for industrial and institutional purposes
- UL Ecologo 2792 for cleaning and degreasing compounds
- UL Ecologo 2759 for hard surface cleaners
- UL Ecologo 2795 for carpet and upholstery care
- UL Ecologo 2777 for hard floor care
- EPA Safer Choice Standard for general purposes: glass, bathroom, carpet, floor care, laundry, wood and metal cleaners used for industrial and institutional purposes

Disposable Paper Products & Trash Bags

- US EPA Comprehensive Procurement Guidelines for janitorial paper and plastic trash can liners – requiring plastic trash bags have 10% - 100% postconsumer recycled content
- California integrated waste management requirements, for plastic trash can liners
- Green Seal GS-09 for paper towels and napkins
- Green Seal GS-01 for tissue paper, paper towels and napkins
- UL Ecologo 175 for toilet tissue and hand towels
- Janitorial paper products derived from rapidly renewable resources or made from tree-free fibers
- FSC Certification for fiber procurement

Hand Soaps

- No antimicrobial agents (other than as a preservative) except where required by health codes and other regulations (e.g., food service and health care requirements)
- Green Seal GS-41 for industrial and institutional hand cleaners
- UL Ecologo 2784 for hand cleaners and hand soaps
- UL Ecologo 2783 for hand sanitizers
- EPA Safer Choice Standard

Disinfectants, metal polish, or other products not addressed by the above standards

- UL EcoLogo 2798 for digestion additives for cleaning and odor control
- UL EcoLogo 2791 for drain or grease trap additives
- UL EcoLogo 2796 for odor control additives
- Green Seal GS-52/53, for specialty cleaning products
- California Code of Regulations maximum allowable VOC levels for the specific product category
- EPA Safer Choice Standard
- Cleaning devices that use only ionized water or electrolyzed water and have third party-verified performance data equivalent to the other standards mentioned above (if the device is marketed for antimicrobial cleaning, performance data must demonstrate antimicrobial performance comparable to EPA Office of Pollution Prevention and Toxics and Design for the Environment requirements, as appropriate for use patterns and marketing claims)

Sustainable Cleaning Equipment

- Vacuums: Certified by the Carpet & Rug Institute (CRI) Green Label program. The dBA value must be less than 70 to reduce noise pollution in building
- Carpet Extractors: Certified by CRI Seal of Approval program

- Powered equipment is ergonomically designed to minimize vibration, noise, and user fatigue in accordance with ISO 5349-1 for arm vibrations, ISO 2631-1 for vibration to the whole body, and ISO 11201 for sound pressure at operator's ear.

Disease Spread Control

In September 2016, the U.S. FDA ruled that 19 ingredients in common "antibacterial" soaps, were no more effective than non-antibacterial soap and water. This does not apply to hand sanitizers, wipes, or healthcare products. The Centers for Disease Control and Prevention recommends using a hand sanitizer with at least 60% alcohol helping prevent illness and the spread of germs. ESRT advises using these recommended hand soaps to reduce disease transmission and aligns with WELL Health-Safety standards to minimize surface contact and choose safer cleaning products. All products are labeled 'low-hazard' or 'safer' by an ISO 14024-compliant ecolabel, a recognized third-party certification, or disclosed ingredients per California State Bill No. 258. None contain substances classified under Section 3 of the SDS with hazardous GHS codes or statements.

- H311 (toxic in contact with skin).
- H312 (harmful in contact with skin).
- H317 (may cause allergic skin reaction). Individual terpenes may present up to a concentration of 0.5% in undiluted products.
- H334 (may cause allergy or asthma symptoms or breathing difficulties if inhaled).
- H340 (may cause genetic defects).
- H350 (may cause cancer).
- H360 (may damage fertility or the unborn child).
- H372 (may cause damage to organs through prolonged or repeated exposure).

Additionally, educational materials for tenants and building occupants is an effective way to reduce the spread of disease. The resources below are designed to help raise awareness about the importance of handwashing at key times in public settings.

- Print Materials
- Fact Sheets
- Social Media Posts and Graphics
- Sample Newsletter/email Announcement For Office Employees

Integrated Pest Management

All areas of the building and site shall utilize IPM techniques. Building staff and/or 3rd-party vendors shall use the following techniques in the building's managed facilities as appropriate:

- Monitoring and Reporting: The IPM team shall use an IPM tracking tool to record pest instantiation, action(s) taken, and occupant notification method. For a sample IPM Tracking Tool see Appendix D
- Notifications: If an emergency arises that requires the use of a chemical, non-least toxic pesticide, a universal building notification shall be issued
    - An emergency is defined as when an imminent threat to health or property occurs
    - Tenants, occupants, and building staff shall be given at least 72 hours' notice by building management prior to the application of a pesticide under normal circumstances and no more than 24 hours after an emergency has occurred
        - Post notification in the building as well as providing written notice to the building
        - The building management shall directly contact the building occupants located in the treated area

        - Notifications about pest control chemical applications shall include product name, active ingredient, product label signal word, time and location of application, and contact information for more details
    - In extreme situations where pests pose a direct health risk and no alternatives exist, the IPM plan may bypass notification requirements, following local laws. Occupants must be notified within 24 hours of pesticide use.
- Environmental Control: Maintain a clean environment to limit pests' access to food, water, and shelter. If an infestation occurs, additional methods may be needed. See Standard Procedures and Implementation Strategies for details
- Documentation:
    - Pest Management Vendor
        - All Material Safety Data Sheets (MSDS) shall be provided by the pest management vendor
        - Logbooks
        - Quarterly sanitation reports of food service areas to address any problems from leaky pipes, floor drains and food debris under workstations.

Pest Control Strategies

Mechanical Controls

- Mechanical controls are directed at destroying a pest and/or its habitat with trapping devices, removal of nests and/or webs, and sealing off cracks or crevices where insects and/or rodents may enter

Chemical Controls

- Chemical Controls refer to pesticides that are used to kill infesting pests and is the last resort for pest control in the building's managed facilities
- Organic Chemical Controls are derived from an organic compound such as tree bark or flowers and comes in the forms of oil or dust and can be highly effective in pest control

Least Toxic Products

- Least toxic products apply to a pesticide product that, other than rodent bait, is applied in a self-contained, enclosed bait station placed in an inaccessible location, or applied in a gel that is neither visible nor accessible
- Contains active ingredients and known inert ingredients that meet the least toxic Tier 3 hazard ingredient under the City and County of San Francisco's hazard screening protocol.

Preventative Pest Management Best Practices

Housekeeping

- Store food in insect-proof containers
- Ensure water drainage where mosquitoes might flourish
- Frequent waste collection at all collection locations and/or waste hauler loading zones
- Maintain and inspect indoor plants

Standard Procedures and Implementation Strategies

Rodent Control

- Trapping Devices:
  - Trapping devices are to be used in regular treatment scenarios on a weekly basis
  - All trapping devices shall be in protected areas and concealed from plain view so as not to be affected by foot traffic, routine cleaning or other operations, including the basement and common areas to maintain a protective rodent barrier throughout the interior of the facility.
  - Dispose all trapped rodents and rodent carcasses in a safe and humane manner
- Rodenticides:
  - All rodenticides, regardless of packaging, shall be placed in an EPA-approved tamper-resistant bait box or a secure location; a secure location is inaccessible to children, pets, wildlife, and domestic animals
  - Rodenticides should only be used outside the building
- Rodent Baits
  - Rodent baits may not be considered least toxic and always require that universal notification be issued
  - Rodent baits shall only be used if they are solid blocks placed in locked outdoor dispenser
  - No second-generation or single-fed rodent baits shall be used if the building is adjacent to parkland, wild areas, or other spaces where wildlife may be affected
- Bait Boxes:
  - All bait boxes shall be maintained in accordance with EPA regulations, with an emphasis on the safety of non-target organisms
  - All bait boxes shall be placed out of the general view, in locations where they will not be disturbed by routine operations
  - The lids of all bait boxes shall be securely locked or fastened shut
  - All bait boxes shall be securely attached or anchored to the floor, ground, wall, or other immovable surface.
  - Bait shall be secured in the feeding chamber of the box instead of the runway or entryways of the box
  - All bait boxes shall be labeled on the inside with the address dated at the time of installation and each servicing; and name of the vendor's business, if used
  - Bait boxes shall only be used outside the building
- Pesticides
  - Apply all pesticides according to the product instructions. All pesticides must be registered with the U.S. Environmental Protection Agency (EPA), state and/or local jurisdiction
  - Approved Products: Only least toxic chemical pesticides shall be used without direct approval from the building
  - Pesticide Storage: Pesticide products shall not be stored in the building without the building's consent or instruction. All chemical application and disposal practices will align with manufacturer recommendations and requirements of GreenShield Certification
  - Application:
    - Application shall be on an as-needed basis
    - The application of pesticides in any area should not occur until pest-specific action thresholds (see below) are met and confirmed with monitoring and inspection
    - Action thresholds can be modified when pests have not met thresholds but are nuisance or disruptive to occupants
    - Written approval must be granted by the building prior to any pesticide application as a preventative measure

- Routine pest control visits must not disrupt tenant productivity nor pose a threat to tenant health or wellbeing
- If pest control visits must occur during the hours of building occupancy, ensure minimal disruption
- Observe all federal, state, and local safety and health requirements always. Where there is a conflict between applicable regulations, the most stringent will apply

Insect Control

- Non-Pesticide Methods:
  - Employ non-chemical methods of control whenever possible.
    - Non-chemical methods may include the use of trapping devices and vacuums rather than pesticide sprays to clean out insect infestations
- Monitoring: Sticky traps shall be used to monitor and evaluate indoor insect control
- Cracks and Crevices: Apply all insecticides as "crack and crevice" treatments only, meaning the insecticide is concentrated and applied to the cracks and crevices only
- Bait Methods:
  - Bait application shall be the building's standard pesticide technology for cockroach and ant control
  - Use bait as a method of insect control in all cases unless some circumstance calls for alternative forms of control in which case the building's approval is required
- Insecticides:
  - Application of insecticides to exposed surfaces or as space sprays is, in general, an unacceptable method of treatment. If used, building management approval is necessary
  - No surface application or space spray shall be made while tenants or occupants are in the building
  - In the case of such an application, the building team shall take all necessary precautions to ensure tenant and employee safety, and the containment of the pesticide to the site of application

Minimization of Risk:

- When pesticide and/or insecticide use is necessary, apply the least hazardous material and use precise application techniques to use a minimal quantity of product.
- A least toxic chemical product is any product for which all active ingredients and known inert ingredients meet the least toxic Tier III Hazard criteria under the City and Country of San Francisco hazard screening protocol.
  - The official San Francisco Pesticide Hazard Screening List is available at: http://www.sfenvironment.org/article/pest-management/least-toxic-pesticides-for-green-buildings
- Least toxic also applies to any pesticide product, other than rodent bait that is applied in a self-contained, enclosed bait station placed in an inaccessible location.
- Under extreme conditions, the use of pesticides or insecticides that do not meet the definition of least toxic may be used when necessary.
- Extreme Conditions
  - Conditions are considered extreme (thus requiring an emergency pesticide application) in the case of an imminent threat to human health or the structural integrity of the building due to pests
  - Discuss with building representative prior to its use giving a full description of the pesticides use - where, when and how it will be used
  - MSDS and Labels shall be sent to the building office and placed within the site logbook, prior to its use
  - Only be used if approved by the appropriate building representative, preferably the building manager

- Pesticide Handling: Transport, handling, and use of all pesticides shall be in strict accordance with the manufacturer's label instructions and all applicable Federal, State, and local laws and regulations.

- Cautionary Labeling for Pesticides
    - The law requires that precautionary statements and signal words be included on all pesticide labels. This does not apply to non-toxic or "natural" materials. If none of the following warnings are provided, do not use pesticide.
        - DANGER - A taste to a teaspoonful taken by mouth could kill an average-sized adult
        - WARNING - A teaspoonful to an ounce taken by mouth could kill an average-sized adult
        - CAUTION - An ounce to over a pint taken by mouth could kill an average-sized adult

Tenant Fit-Out Alignment

This policy is aligned with ESRT's High Performance Design and Construction Guidelines. For information regarding IEQ requirements in tenant spaces, see Appendix F High-Performance Design and Construction Guidelines.

Ongoing Monitoring & Evaluation

IEQ evaluations shall occur on an ongoing basis to ensure strategies are being implemented where applicable. IEQ evaluations shall be performed by the property manager and responsible vendor or service provider.

Integrated Pest Management

- Track and report metrics including:
    - Date and Time
    - Vendor
    - Pesticide Applied
    - Toxicity (Tier 1, 2,3)
    - Location in Building
    - Observed Pest Type
    - Prevention Measures
    - Method of Notification
- Refer to Appendix D for Sample IPM Tracking Tool to document compliance with policy.

Green Cleaning

- Track and report metrics including:
    - Product
    - Cost
    - Sustainability Criteria
- Refer to Appendix E for Sample Green Cleaning Tracking Tool to document compliance with policy.

Resources

- Green Cleaning:
    - https://www.greenseal.org/products-services/
    - EPA Green Cleaning Standards and Product Recommendations
    - EPA Design for Environment (Dfe)
    - EU Ecolabel Product Catalogue
- Integrated Pest Management:
    - https://www1.nyc.gov/assets/doh/downloads/pdf/pesticide/ipm-toolkit.pdf
    - Official San Francisco Pesticide Hazard Screening List

    - http://www.greenshieldcertified.org/find-a-provider/
- Low-Emitting Material Criteria:
    - http://greenguard.org/en/CertificationPrograms/CertificationPrograms_childrenSchools.aspx
    - http://www.aqmd.gov/home/rules-compliance/compliance/vocs/architectural-coatings/tos
    - https://www.aqmd.gov/home/rules-compliance/compliance/vocs/adhesive-and-sealants#

SUSTAINABLE PROCUREMENT POLICY

Context

ESRT recognizes that the procurement of products and services has potential environmental, social and governance impacts in the communities in which we operate. We are committed to working with vendors who operate in a responsible and sustainable manner and will help us maintain and promote our high standards regarding environmental practices and sustainability. ESRT will ensure these guidelines are implemented across our portfolio.

Objectives

Frequency	Goal	Portfolio Manager	Property Manager	Custodial Staff	Sustainability Team
Annual	Implement the environmentally preferred purchasing policy	✓	✓	✓	✓
	Increase the sustainability of future purchases of ongoing consumables, durable goods, facility alteration and additions, reduced mercury in lamps, and food.		✓	✓	✓
	Lamp Purchases: 100% of lamps have 60 picograms of mercury per lumen-hr. or less (performance measurement is by number of lamps)		✓		✓
	Ongoing Consumables: At least 75% of total purchases meet sustainability criteria (performance measurement is by cost)		✓		✓
	Durable Goods & Electric Powered Equipment: 90% meet sustainability criteria (performance measurement is by cost)		✓		✓
	Food: 25% meet sustainability criteria (performance measurement is by cost)		✓		✓
	Provide this policy to all suppliers/vendors to ensure they are aware of and comply with the policy.		✓	✓	✓
	Track purchases to ensure they meet environmentally preferred purchasing criteria.		✓	✓	✓
	Educate and engage tenants in sustainable procurement practices.		✓	✓	✓

Responsibility

It is the responsibility of all ESRT employees who purchase goods on behalf of ESRT including **Property Managers, Tenant Service Coordinators (TSCs), Custodial Staff, Sustainability Team,** and relevant vendors to understand these guidelines and implement them wherever feasible.

Asset Level Requirements

Scope

This policy refers to all purchases of the following types of products:

- Ongoing Consumables: Ongoing consumables refer to low cost-per-unit materials that are regularly used and replaced throughout the daily course of business
    - Paper, toner cartridges, binders, notebooks, envelopes, batteries, desk accessories
- Durable goods: Durable goods have a useful life of two years or more and are replaced infrequently or may require capital program outlays. Examples include the following:
    - All office equipment, appliances, and audiovisual equipment
    - Other electric powered equipment
- Lamps: All lamps purchased should have reduced the mercury content, to avoid the potential adverse health effects of mercury.
- Food: Environmentally preferred purchasing criteria for food helps to encourage purchasing locally sourced, organic food which is better for the environment.

Ongoing Consumables: Purchases shall meet the following criteria:

- **Paper:** All office white copy paper shall be at least 75% post-consumer recycled content paper. All other papers shall at least meet minimum EPA guidelines for recycled content.
    - 2-Sided (Double Sided) printing shall be standard at all printing stations
- **Postconsumer recycled content.** The content of purchases must meet or exceed the levels listed in the U.S. Environmental Protection Agency Comprehensive Procurement Guidelines. Products not covered by the Guidelines can get credit for their recycled content with no minimum. (http://www.epa.gov/epawaste/conserve/tools/cpg/)
- **Extended use.** Batteries must be rechargeable. Toner cartridges for laser printers must be remanufactured.
- **Bio-based materials.** Bio-based products must meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials must be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving countries. Exclude hide products, such as leather and other animal skin products.
    - **Paper and wood products**. Paper and wood products must be certified by the Forest Stewardship Council or USGBC-approved equivalent. At least 75% of all composite wood, by cost or surface area, meets the Formaldehyde emissions evaluation.5

Durable Goods: Purchases shall meet the following criteria:

- **EPEAT rating.** The equipment must have an Electronic Product Environmental Assessment Tool (EPEAT) Silver rating or better.
    - **ENERGY STAR rating**. If the equipment does not yet fall under the EPEAT rating systems, it must be ENERGY STAR® qualified or performance equivalent for projects outside the U.S. When purchasing workstation monitors, consider opting for one large monitor (with split screen capabilities) as opposed to two monitors – providing equal screen area with less energy consumption. All monitors should be ENERGY STAR rated.
- **LEED Guidance for Sustainable Product:** Ensure equipment will help project meet the thresholds specified in the LEED standards. Purchases must adhere to the 2009 LEED for Existing Buildings. According to LEED, sustainable purchases are those that meet one or more of the following criteria:
    - Purchases contain at least 10% of postconsumer and/or 20% postindustrial materials.

  - Purchases contain at least 50% of rapid renewable materials.
  - Purchases contain at least 50% of materials harvested and processed or extracted and processed within a 500-mile radius of the project. Building materials or products shipped by rail or water have been extracted, harvested, or recovered, as well as manufactured within a 500-mile total travel distance of the project site.
  - Purchases consist of at least 50% Forest Stewardship Council certified paper products.
  - Batteries are rechargeable.
- **Electric-Powered Equipment:** Equipment is ENERGY STAR qualified, and the equipment (either battery or corded) replaces conventional gas-powered equipment.
- **Low Noise**: Walls, partitions and floor/ceiling assemblies separating dwelling units or spaces from each other, from adjacent occupancies, from stairs or from mechanical equipment spaces, including boiler rooms, or elevator or other shafts shall have a minimum sound transmission class (STC) rating of 55. For residential buildings, ensure installation of quiet space heating, cooling, and ventilation systems in each dwelling unit. In each regularly occupied space, achieve maximum background noise levels from heating, cooling, and ventilation systems to ensure they are at or below the following thresholds: 35 dBA for living areas and 40 dBA for kitchens and baths.

Reduced Mercury in Lamps: To reduce mercury content in lamps, all vendors should provide information on energy efficiency and lamps that have low mercury counts. As applicable, all lamps purchased should comply with the minimum level of mercury content specified below. 100% of lamps (performance measured by the number of lamps) will contain:

- 60 picograms of mercury per lumen-hour or less

Food: Where applicable, vendors are selected that provide environmentally preferred purchasing of foods. This includes food purchased for the office staff as well as food provided by outside catering services that are directly related to Agency meetings or events. A target goal of 25% of total combined food and beverage purchases (performance measured by cost) shall meet one or more of the following criteria:

- **Sustainable Agriculture:** Food and beverages labeled USDA Organic, Food Alliance Certified, Rainforest Alliance Certified, Protected Harvest Certified, Fair Trade or Marine Stewardship Council's Blue Eco-Label.
- **Local Sourcing of Food & Beverages**: Food or beverage must contain raw materials harvested and produced within 100 miles of the site.
- **Service ware and Packing:** Should be reusable, recycled content, readily recyclable, or compostable. Plastic film wrap, single use serving trays, and other single use supplies are strongly discouraged.
- When developing a menu, consider following the nutrition guidelines in the Fitwel Meetings and Events Catering Standard.

Facility Alterations & Additions:

Criteria for solid waste management and indoor air quality best management practices during facility alterations and additions are in the High-Performance Design and Construction Guidelines. Ensure all building materials purchased for renovations are low/no VOC and are formaldehyde free.

Vendor Contracts: ESRT places a priority on environmentally preferable purchasing by integrating sustainability requirements as part of the evaluation criteria for contracting services.

Each bid received during solicitation will require the company to describe their environmental stewardship as well as answer questions regarding the sustainable aspect of the products they use. This includes the following, where applicable:

- Recycled Content of Product (allocated by pre- and post- consumer where feasible)
- Energy and Water Savings
- Chemicals Used in the Product's Manufacturing
- Packaging of the Product
- Transportation and Disposal Programs
- Environmentally preferable purchasing policy of the company

Ongoing Monitoring & Evaluation

- Track and report the following metrics on a quarterly/bi-annual or annual basis to evaluate progress towards the goals set forth in this policy.
    - Ongoing Consumables Purchases: Product, Cost, Sustainability Criteria. For a template log to track ongoing consumables, refer to Appendix Q: Sustainable Procurement Ongoing Consumables Tracking Log
    - Durable Goods Purchases: Product, Cost, Sustainability Criteria
    - Mercury Content in Lamps: Product, Mercury Content
    - Food: Event, Product, Cost, Sustainability Criteria
- For vendor contracts, maintain RFP responses that outline sustainability criteria and ensure compliance with the policy.

Resources

1. ENERGY STAR Product Finder: https://www.energystar.gov/productfinder/
2. EPEAT Product Registry (Sustainable Electronics): https://www.epeat.net/
3. Fitwel Meetings & Events Catering Standard: https://www.fitwel.org/wp-content/uploads/2020/01/Fitwel-Meetings-and-Events-Catering-Standard-2020.pdf

SITE MANAGEMENT POLICY

Context

ESRT is committed to preserving ecological integrity and encourage environmentally sensitive site management practices that provide clean, well-maintained, and safe buildings. We will work with vendors who operate in a responsible and sustainable manner and will help us maintain and promote our high standards regarding environmental practices and sustainability. ESRT will ensure these guidelines are implemented across our portfolio.

Objectives

Frequency	Goal	Portfolio Manager	Property Manager	Custodial Staff.	Sustainability Team
Ongoing	Reduce noise and air pollution resulting from gasoline powered equipment	✓	✓	✓	✓
	Use environmentally preferred deicers 100% of the time for snow and ice removal	✓	✓	✓	✓
	Implement erosion and sedimentation control measures 100% of the time		✓		✓
	Compost 100% of plant material waste		✓	✓	✓
	Landscape with native, adaptive and insect/disease resistant and indigenous plants.	✓	✓		✓
	Prior to applying chemical pesticides or baits, alternative pest control methods will be used in 100% of cases		✓	✓	✓
	Perform soil testing prior to 100% of fertilizer applications to reduce fertilizer usage to only as needed for plant health applications		✓		✓
	Track usage to ensure they meet environmentally preferred criteria.	✓	✓	✓	✓

Responsibility

Portfolio Managers, Property Managers, Director of Custodial and Custodial Staff, Tenant Services Coordinator, Maintenance, Landscaping Vendors, and On-Site Staff shall ensure that the procedures and strategies are implemented at their property.

Asset Level Requirements

Scope

Site Maintenace Equipment

- Manual equipment will be used whenever practical. When power equipment must be used, electric power equipment, instead of conventional gas-powered equipment, shall be used.

- When new equipment is needed, replace conventional equipment with lower-impact alternatives. Choose equipment designed to minimize or recycle waste.
- Powered equipment will operate at a sound level of 70 dBa or less.
- Pressure washing equipment and systems used to clean sidewalks and other hardscape areas will reclaim water for reuse and recycling. This will prevent contaminated water from entering local waterways.
- During the annual site cleanup, maintenance personnel shall manually prune winter-killed plants; sweep parking lot curbs, turf areas and corners by hand; and rake turf areas to remove debris as necessary.

Snow and Ice Removal

Some chemicals used for snow and ice removal, such as calcium chloride and sodium chloride, are toxic to vegetation and local aquatic ecosystems. The property should implement snow and ice removal practices that minimize the amount of chemicals used and therefore prevent ecological damage.

Products that are 100% calcium magnesium acetate or that meet the U.S. EPA Safer Choice standard for deicers will be used to remove snow and ice from hardscape on the building site rather than calcium chloride, sodium chloride or blends containing calcium chloride and sodium chloride. Prior to purchasing deicer products, the MSDS will be reviewed to confirm the product ingredients. Products containing sodium chloride or calcium chloride may only be used during snow events when the temperature reaches 10 degrees Fahrenheit or below.

<u>Practices to Optimize Snow Removal</u>

- Application rates shall be tailored to match actual conditions based on pavement temperature, precipitation and beginning concentrations of the deicers.
- Sidewalks and parking lots shall always be plowed prior to the application of deicing agents - to limit the amount of chemicals needed and reduce the potential for harmful runoff.
- When possible, anti-icing measures (preemptively applying deicer before a storm) shall be performed, thereby significantly reducing the overall need for deciding chemicals.
- Maintenance staff will assess all walkways, sidewalks, and entryways to identify critical, high-traffic routes. When snow falls during regular operating hours, snow removal will take place frequently to lessen the possibility of snow compacting caused by pedestrians, cars, and other traffic. Compacted snow will make removal more difficult and will increase the chance that ice will form.

Erosion and Sedimentation Control

- Comply with state erosion and sedimentation control measures during any future construction as defined in state sediment control guidelines.
- Check and remove plant detritus from hardscapes and paved surfaces.
- Sidewalks are to be cleaned once per day for both site aesthetics and sediment control.
- Structural erosion control is to be in place during any future construction/excavation activities.
    - Erosion control practices are to comply with EPA's Stormwater Pollution Prevention Plans for Construction Activities.
    - To ensure performance, the Director of Operations or Custodial Supervisor will regularly inspect the job site and take photos of any soil runoff occurring on the job site.
- The Custodial Supervisor will periodically walk through the site area to inspect landscaping installations and monitor the site for any soil loss, runoff or evidence of overwatering. The Custodial Supervisor will also work with the appropriate parties to address any soil loss with corrective and preventive measures.

Plant Material Waste Management

Any plant or landscaping waste is to be collected and sent to a composting facility or municipal composting program.

Landscape Management

- Landscape with native, adaptive and insect/disease resistant and indigenous plants.
- Mechanical removal of landscape bed weeds
- Use organic and natural materials whenever feasible
- Treat pest infestations found to be above threshold limits via targeted spray instead of blanket applications
- Leave an 18-inch buffer between the building and landscaping to block direct access into the building
- Maintain landscape routinely to make plants less susceptible to pest infestations and weed growth

The following plant species are considered invasive in the New York metropolitan area. The landscape vendor or on-site maintenance team will monitor the site for these plant species during routine operations. If identified, the invasive species will be removed by digging up the plant roots and disposing of them through compost.

Technical name	Common name
Phyllostachys aurea	Golden Bamboo
Fallopia japonica	Japanese Honeysuckle
Alliaria petiolata	Garlic Mustard
Phyllostachys aureosulcata	Yellow Groove Bamboo
Rubus phoenicolasius	Japanese Wineberry
Elaeagnus umbellata	Autumn Olive

Fertilizer Usage: All plants are native plants and do not require fertilizer. If fertilizer were to be used, the fertilizing plan/anticipated schedule for the year will be delivered to the Director of Operations at least once per year to facilitate discussion of alternatives and chemical use reduction. Fertilizer usage and type will be reported to the Director of Operations to facilitate tracking and measurement of performance against a goal of at least 25% organic fertilizer use OR a 25% reduction in fertilizer usage over a prior baseline year.

Irrigation Management: There are no irrigation systems at the property site currently. For any future landscaping select plant species that are native/adaptive and do not require irrigation. The Property Management team will reduce potable water use (and that of natural surface and subsurface water) to at least 50% below that typical of irrigation systems in the region and will implement those water-use reduction actions that are economically feasible. This shall be achieved by referencing local norms for irrigation systems and water use, and/or by using local tools to calculate the achievement of reduced water use.

Rainwater Management: Implement annual inspections and maintenance programs for all rainwater management facilities, such as green roofs or vegetation areas, to ensure continued performance.

Heat Island Reduction Consideration: Plants that provide shade over paving areas, vegetated planters, and shade with vegetated structures are all nonroof measures to reduce heat islands and counteract the intensifying heat caused by climate change. Vegetated or green oofs with sufficient growing medium and plant material are assumed to provide full vegetive cover within 3 years.

Storage of Materials and Equipment

All powered and manual maintenance equipment will be stored in a locked maintenance room. Any storage areas containing chemicals and equipment will be ventilated. Care will be taken during the storage process to prevent air and site contamination.

Operational Safety Plan

All in-house maintenance and custodial staff, including backup personnel, are required to attend operational safety training annually. Training covers general precautions, health tips, proper toxic chemical usage and spill management, hazards of toxic chemicals, electrical hazards, cleaning and maintenance best practices to protect vulnerable occupants, equipment maintenance, conversation of energy and water usage, how to properly wear personal protective equipment (PPE), and waste sorting and zero waste best practices.

Ongoing Monitoring & Evaluation

- Track and report the following metrics on a quarterly/bi-annual or annual basis to evaluate progress towards the goals set forth in this policy.
    - Maintenance equipment: equipment type, number of equipment items, usage hours, and when replacement of old equipment with low-impact, low-decibel or electric equipment occurs
    - Snow removal and ice prevention: weight and cost
    - Plant material waste disposed: weight and cost
    - Erosion control: number of deficiencies found
    - Mulch applied: weight and cost
    - Fertilizers and pesticides used: weight of diverted and cost
    - Green roof or vegetation area for rainwater management: erosion evidence and maintenance or repairs performed, cost
    - Bird-window collisions: number of events and location
- For vendor contracts, maintain RFP responses that outline sustainability criteria and ensure compliance with the policy.

Resources

1. Department of Environmental Conservation Invasive Species: https://dec.ny.gov/nature/invasive-species
2. Organic Grounds Maintenance at Harvard University: https://www.energyandfacilities.harvard.edu/facilities-services/landscape-maintenance/organic-maintenance-program

SUSTAINABLE TRANSPORTATION POLICY

ESRT is committed to promoting transportation options that support human-centered mobility and reduce the negative impacts of single-occupant vehicles on greenhouse gas emissions, public health and safety, traffic congestion, and land development. This includes providing bicycle infrastructure, pedestrian-friendly streets, and convenient access to public transit.

Frequency	Goal	Portfolio Manager	Property Manager	Property Maintenance	Sustainability Team
Ongoing	Monitor preferred occupant travel method	✓	✓		✓
	Implement sustainable transportation policy at all facilities	✓	✓		✓
	Provide bicycle infrastructure	✓	✓		✓
	Promote sustainable transportation options to tenants	✓	✓		
	Prioritize underperforming assets for further studies and upgrades	✓			✓
	Provide locker and shower facilities	✓	✓		✓
	Ensure bicycle storage safety procedures, Maintenance and cleanliness		✓	✓	

Responsibility

Portfolio Managers, Property Managers, Tenant Service Coordinators, Engineering, and Sustainability Teams are responsible for understanding and applying best practices from this plan across all ESRT-managed assets. Portfolio and Property Managers will also conduct annual tenant surveys on sustainable transportation methods.

Asset-Level Requirements

Part I: Baseline

To implement the Sustainable Transportation Policy, it is necessary to first understand what current factors impact the occupant's choice in transportation methods. The following best practices will help to assess current conditions and identify opportunities for improvements:

- **Tracking**: Ensure occupant surveys are distributed annually to collect data on sustainable transportation methods used.
- **Building Amenities:** Analyze tenant amenities that support sustainable transportation, including availability, marketing, and accessibility. Amenities may include:
    - Bicycle storage
    - E-scooter parking
    - Lockers
    - Showers
    - Changing Room

Part II: Performance

- **Promote Public Transit Options:** Review and promote nearby public transit options to tenants. Public transit options can include trains, subways, buses, and/or ferries. Locate each public transit station and share with tenants at move in and during lease terms.
- **Engage and educate tenants:** Provide guidelines, fact sheets or emails to building tenants to share environmental impacts of sustainable transportation and building amenities provided. Include informational signage on elevator screens with closed public transit options.

Strategies and Guidance

Existing Supportive Measures

- Proximity to public transit
- Pedestrian-friendly design
- Bike and e-scooter parking facilities onsite
- Onsite showers and lockers
- No parking onsite
- Mixed use building with first floor retail including Chipotle, Chopt, Starbucks Reserve, FedEx, etc.
- Pre-tax transportation benefits for onsite employees which can be used for public transportation
- Telework option for corporate employees

Mode of Transportation	Local Public Transportation Within 0.5 Miles
Metro/Subway/Light Rail	34th St Herald Sq • Lines 3, B, D, F, M 34th St – Penn Station
Commuter Rail	Penn Station
Bus, Tram, Other On-Street Public Transportation	Corner of 34th St and Fifth Avenue • M34A: SBS Waterside – Port Authority Term. • M34: SBS East Side – Javits Center • B101 • M1 • BXM4 Corner of 34th St and Broadway • M34A: SBS Waterside – Port Authority Term. • M34: SBS East Side – Javits Center • BM2 • BXM4 • M55
Ship, Boat, Ferry	34th St Ferry Terminal
E-Mobility/Bike-Share	E-bike parking onsite Bike storage onsite Public bicycle rental

CLIMATE CHANGE ADAPTATION & RESILIENCE POLICY

Context

Climate change poses a risk to the real estate sector, as buildings and their construction and operation account for up to 36% of global annual greenhouse gas emissions. ESRT's ability to assess and respond to climate impacts is essential to its overall value and to serving tenants, employees, investors, and other stakeholders. The increasing frequency and severity of natural disasters and extreme weather events make climate resilience a priority. This includes adapting to and recovering from these impacts. By identifying climate risks, ESRT can manage and reduce them through mitigation strategies and limit economic losses while delivering long-term value. ESRT is committed to improving the environmental performance of every asset in its portfolio and supporting sustainable development. This policy applies to both existing properties and potential acquisitions.

Objectives

Frequency	Goal	Portfolio Manager	Property Manager	Sustainability Team
One-Time	Incorporate climate change risk assessments into the Acquisition Due Diligence process	✓	✓	✓
	Conduct climate change risk assessments at all existing assets	✓	✓	✓
	Develop a short-term implementation plan for mitigating risk at assets with the highest risk; develop a long-term implementation plan for all other assets.	✓	✓	✓
Annual	Implement identified climate change risk mitigation strategies	✓	✓	✓
	Attend disaster recovery readiness/emergency preparedness training	✓	✓	✓

Responsibility

It is the responsibility of **Portfolio Managers, Property Managers, and Sustainability Team** to be familiar with this plan, perform risk assessments, and implement necessary improvements.

Asset-Level Requirements

Part I: Baseline

To implement the *Climate Change Adaptation & Resilience Policy*, property managers must first assess each asset's exposure and vulnerability to climate-related risks. The following requirements support this assessment:

- **Identify relevant climate change risks:** Utilizing the Climate Change Risk Assessment Checklist in Appendix G. identify what assessments have been performed and what relevant climate change risks have been identified.
- **Analyze climate change risks and potential impact:** Conduct an asset-level risk assessment to identify the potential impact of climate change risks.
    - *See the Strategies and Guidance section for tools and resources to inform risk assessments*

Part II: Performance

Once an asset is exposed and vulnerable to climate-related threats and is understood, property managers can develop an operational response plan and implement improvement measures that will increase resilience and mitigate risk.

- Develop and implement an operational plan for mitigating and responding to climate risks identified and analyzed in baseline studies.
    - See the Strategies and Guidance section for tools and resources to inform risk mitigation strategies.

Each property team is to participate in disaster recovery readiness/emergency preparedness training annually. Property-specific training is held once per year, and portfolio-wide training is held twice per year. Teams will be notified when training is taking place. This training should be utilized to help inform a property's bespoke emergency action plan.

Strategies and Guidance

Identify Relevant Climate Change Risks

The first step that the portfolio manager or property manager should take towards mitigating risks of their managed asset is to identify the most relevant climate change risks to the asset. For example, assets in New York City and Stamford may need to focus on mitigation strategies for storm surges, wind damage and heat waves, while assets in California may need to focus on mitigation strategies for droughts, earthquakes and wildfires.

Below are some of the impacts that are currently relevant for the Northeast region where ESRT's properties are located. These impacts will continue to worsen and affect this region, according to the Fourth National Climate Assessment Report, released by the U.S. Global Change Research Program. This list can provide a starting point for initiating risk assessments:

Environmental Hazards, US, Northeast Region

- Heat waves and higher average annual temperatures
- Heavy rain events and increased annual precipitation
- Hurricane/coastal windstorms
- Storm surge and sea level rise
- Severe winter storms and freeze

Property managers should utilize the Climate Change Risk Assessment Checklist in Appendix G as a starting point for assessing their assets. The expected outcome of this step is to have a baseline understanding of what risk assessments have already been performed and the types of climate change risks that have been identified at each asset.

Analyze Climate Change Risks & Potential Impact

A risk assessment evaluates assets vulnerable to natural hazards, extreme weather, and other climate-related impacts. Its purpose is to help property managers understand exposure and vulnerability, enabling informed decisions to reduce risk. Assessing a portfolio also helps prioritize assets for mitigation strategies. Any gaps identified through the Climate Change Risk Assessment Checklist should be addressed through additional risk assessments.

To conduct a comprehensive risk assessment, many resources should be considered. The U.S. Climate Resilience Toolkit offer an extensive list of climate change-related tools and resources that provide access to the data needed to conduct the risk assessment. Use tools and resources that are relevant for the assets that are being assessed. The following hazard resources should be reviewed (as applicable), including:

- Flooding, storm surge and sea level rise:

- NYC Flood Zone mapper: Data & Maps - NYC Housing Recovery
- FEMA inland flood maps: FEMA Flood Map Service Center | Search By Address
    - NOAA coastal flooding / sea level rise maps: https://coast.noaa.gov/floodexposure/#/map
- Hurricane:
    - NOAA historical hurricane tracks: https://coast.noaa.gov/hurricanes/

The above resources will enable the identification of general at-risk areas but are not able to provide a complete assessment of risk exposure for any individual asset. The most recent asset-specific documents should also be reviewed (as available), including:

- Property Condition Assessment (PCA)
- Roof Report
- Phase I Environmental Site Assessment
- Seismic Study

When performing the risk assessment, utilize the tools provided by the Department of Homeland Security's Ready Risk Assessment webpage to record the findings. Using the following tools in the risk assessment process will allow the portfolio manager to compare assets within the ESRT portfolio to prioritize the most vulnerable assets for implementing mitigation strategies:

Identify & Implement Strategies to Mitigate Climate Change Risks

The risk assessment may result in the identification of areas where assets are vulnerable to climate change-related impacts (e.g., an asset located in a 100-year flood zone). The next step is to determine potential mitigation strategies. While solutions will need to be tailored to the individual asset, they will generally consist of operational strategies and/or capital strategies,

- Operational strategies involve the development of tools for use before, during, and after an emergency event. These can include a checklist of preparations to be completed by building staff and a building occupant communication and evacuation plan.
- Capital strategies include investment-driven responses such as installing flood barriers, making roof improvements, installing backup generators, etc. Capital strategies will require additional study to determine feasibility, payback, etc.

Operational Plan Development

The following resources developed by FEMA and FM Global can provide an effective starting point for developing asset-specific mitigation and response strategies to various climate threats. Property Managers should download these tools and use them as the framework for building and implementing their asset-level plan.

- Flood
    - FM Global NatHaz Toolkit: Flood
    - Prepare for Flood | FM NatHaz Toolkit
        - *Understanding the Hazard: Flood*
        - *Flood Emergency Response Plan*
        - *Flood Checklist*
- Windstorm/Hurricane
    - FM Global NatHaz Toolkit: Windstorm
    - Windstorm preparation and severe weather events – FM
        - *Understanding the Hazard: Wind from Tropical Storms*

        - *Understanding the Hazard: Exterior Wall Assemblies*
        - *Protecting Your Facility Against Major Windstorms*
        - *Protecting Roofing Systems Against Windstorm Damage*
        - *Wind Checklist*
- Freeze/Winter Storm
    - FM Global NatHaz Toolkit: Freeze
    - Nathaz toolkit: manage threat of natural hazards – FM
        - *Understanding the Hazard: Freeze*
        - *Protecting Your Facilities from Winter Storms*
        - *Freeze-Up Checklist*
- Emergency Response Plan
    - Ready.gov
    - https://www.ready.gov/business/implementation/emergency

Documentation

The property manager is to provide the following baseline documentation:

- Climate Change Risk Assessment Checklist

The property manager is to provide the following performance documentation:

- Operational plan for mitigating and responding to climate change risks

Ongoing Monitoring & Evaluation

Climate Change Risk Assessment Checklists should be completed on an ongoing basis to identify climate change risk mitigation strategies and assess portfolio-wide risk to identified hazards.

Resources

1. Third National Climate Assessment Report: Provides an in-depth look at climate change impacts on the U.S. and details the ways climate change is already affecting and will increasingly affect the lives of Americans.
2. U.S. Global Change Research Program: Comprises 13 Federal agencies that conduct or use research on global change and its impacts on society, in support of the Nation's response to global change.
3. U.S. Climate Resilience Toolkit: Designed to help people find and use tools, information, and subject matter expertise to build climate resilience. The Toolkit offers information from across the U.S. federal government in one easy-to-use location.
4. U.S. Geological Survey: Provides science about the natural hazards that threaten lives and livelihoods, water, energy, minerals, and other natural resources, the health of ecosystems and environment, and the impacts of climate and land-use change.
    - U.S. Geological Survey's One-Year 2017 Seismic Hazard Forecast
5. NYC Flood Hazard Mapper: Flood zone visualization tool for New York City.
6. NOAA's Sea Level Rise Viewer: A tool used to view potential sea level rise scenarios and impact on the area.
7. Department of Homeland Security's Ready Risk Assessment: Resources for performing a risk assessment.
    - Risk Assessment Table
    - Business Impact Analysis Worksheet
8. World Resources Institute (WRI) Aqueduct Tool: Enables users to identify exposure to water-related risks, including flood occurrences and drought severity.

9. Returns on Resilience: The Business Case: Identifies real estate projects designed to perform well in the face of climate change-related threats and identify ways in which investments in resiliency strategies can provide financial and other returns.
10. Natural Disasters Association: Educational resources on natural hazards and disaster management.

APPENDIX: RESOURCES & TEMPLATES

APPENDIX: GLOSSARY

- 100-Year Flood: A 100-year flood is a flood event that has a 1% probability of occurring in any given year.
- Climate Change: Changes in average weather conditions that persist over multiple decades or longer. Climate change encompasses both increases and decreases in temperature, as well as shifts in precipitation, changing risk of certain types of severe weather events, and changes to other variables in the climate system.
- Climate Risk: The chance that investments can be affected by the physical impacts of climate change. Risks are evaluated as a product of the likelihood of occurrence (probability) and the damage that would result if they did occur (consequences).
- Climate Resilience: The ability to prepare for and adapt to changing conditions; and withstand, respond to, and recover rapidly from disruptions (HUD).
- Climate Adaptation: Adjusting natural or human systems in a new or changing environment that reduces negative effects and takes advantage of opportunities (HUD)f
- Commissioning: The process of verifying and documenting that a building and all its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the owner's project requirements.
- CO: Carbon Monoxide, a colorless, odorless, and tasteless gas that greatly affects indoor air quality. Because it is impossible to see, taste, or smell the toxic fumes, CO can kill before there is awareness that it is in the home. At lower levels of exposure, CO causes mild effects that are often mistaken for flu. These symptoms include headaches, dizziness, disorientation, nausea, and fatigue.
- Drought: A prolonged period of abnormally low rainfall, leading to a shortage of water.
- Energy Audit: A building or campus-level assessment of major energy consuming systems, for the purpose of identifying opportunities for energy conservation.
- Energy Benchmarking: Ongoing review of energy performance to determine if a building is improving or declining performance in comparison to its previous performance, other buildings within a portfolio, or similar buildings.
- ENERGY STAR score is a measure of how well your property is performing relative to similar properties, when normalized for climate and operational characteristics (1- 100).
- Erosion: The process of gradually wearing away soil, rock and land by wind, water, or other natural agents.
- ETS: Environmental Tobacco Smoke. Environmental tobacco smoke (ETS) refers to exposure to tobacco smoke – not from directly smoking, but from being exposed to someone else's cigarette, cigar, or pipe smoke. ETS can also be described as the material in indoor air that originates from tobacco smoke. Breathing in ETS is known as passive smoking, second-hand smoke, or involuntary smoking.
- Extreme Weather Event: A weather event that has a low probability of occurring at a particular place and time of year, including, for example, heat waves, cold waves, heavy rains, periods of drought and flooding, and severe storms
- Flash Flood: A rapid flooding of low-lying areas: washes, rivers, dry lakes, and basins.
- General Emissions Criteria: CDPH Standard Method v1.1: California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, v. 1.1–2010, for the emissions testing and requirements of products and materials.
- Greenhouse Gas Emissions: Gases including carbon dioxide, methane, nitrous oxide and fluorinated gases trap heat in the atmosphere and contribute to climate change.
- GREENGUARD Gold Certification: Indoor air quality certification standard for low-emitting products. It was formerly known as GREENGUARD Children & Schools Certification.
- Heat Wave: A period of excessively hot weather, which may be accompanied by high humidity.
- IAQ: Indoor Air Quality.

- Indoor Air Quality (IAQ) Management Plan: Plan developed by the Contractor to provide a healthy indoor environment for workers and building occupants during construction. Plans must meet or exceed the recommendations of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) "IAQ Guidelines for Occupied Buildings Under Construction."
- LED (Light-Emitting Diode): Energy-efficient lights that produce less initial heat per lumen, consume less energy, and last longer than conventional incandescent and fluorescent lights.
- MERV: Minimum Efficiency Reporting Value. A value determined by the ASHRAE 62.2 Standard corresponds to the efficiency and target particle size of air filters for mechanical systems. MERV values range from 1 to 16. The higher the MERV value, the smaller the particles that the filter will trap, and the more efficient the filter will be at eliminating airborne contaminants.
- Mitigation: The effort to reduce loss of life and property by lessening the impact of disasters.
- Natural Hazard: Naturally occurring physical phenomena caused either by rapid or slow onset events which can be geophysical (earthquakes, landslides, tsunamis, and volcanic activity), hydrological (avalanches and floods), climatological (extreme temperatures, drought, and wildfires), or meteorological (cyclones and storm/wave surges).
- NYCECC: New York City Energy Conservation Code
- Ocean Acidity: A term used to describe significant changes to the chemistry of the ocean. It occurs when carbon dioxide gas (or CO2) is absorbed by the ocean and reacts with seawater to produce acid.
- Recycled Content: Recycled content is the sum of post-consumer recycled content plus one-half the pre-consumer recycled content, based on cost.
- Retro-commissioning: The application of the commissioning process to an existing building to ensure that building equipment and systems function as designed, considering both the original design and past major system alterations.
- Storm Surge: An abnormal rise of water generated by a storm, over and above the predicted astronomical tides.
- Source Energy Use Intensity (Source EUI) - The total amount of all the raw fuel required to operate your property, including losses that take place during generation, transmission, and distribution of the energy divided by the building's square footage.
- TVOC: Total Volatile Organic Compound: sum of volatile organic compounds [see VOC], sampled on detected with a flame ionization detector (TVOC-FID) or mass spectrometric detector (TVOC-MS).
- VOC (Volatile Organic Compound): Carbon compounds that participate in atmospheric photochemical reactions (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, and ammonium carbonate). The compounds vaporize (become gas) at normal room temperatures.
- WaterSense: U.S. Environmental Protection Agency's independent product labelling program which certifies high-performing, water-efficient water fixtures.

APPENDIX A: ASHRAE 62.1 Ventilation System Maintenance Checklist

TABLE 8.2 Minimum Maintenance Activity and Frequency for Ventilation System Equipment and Associated Components

Inspection/Maintenance Task	Frequency*
a. Investigate system for water intrusion or accumulation. Rectify as necessary.	As necessary
b. Verify that the space provided for routine maintenance and inspection of open cooling tower water systems, closed cooling tower water systems, and evaporative condensers is unobstructed.	Monthly
c. Open cooling tower water systems, closed cooling tower water systems, and evaporative condensers shall be treated to limit the growth of microbiological contaminants, including *legionella sp.*	Monthly
d. Verify that the space provided for routine maintenance and inspection of equipment and components is unobstructed.	Quarterly
e. Check pressure drop and scheduled replacement date of filters and air-cleaning devices. Clean or replace as necessary to ensure proper operation.	Quarterly
f. Check ultraviolet lamp. Clean or replace as needed to ensure proper operation.	Quarterly
g. Visually inspect dehumidification and humidification devices. Clean and maintain to limit fouling and microbial growth. Measure relative humidity and adjust system controls as necessary.	Quarterly
h. Maintain floor drains and trap primer located in air plenums or rooms that serve as air plenums to prevent transport of contaminants from the floor drain to the plenum.	Semiannually
i. Check ventilation and indoor air quality related control systems and devices for proper operation. Clean, lubricate, repair, adjust, or replace as needed to ensure proper operation.	Semiannually
j. Check P-traps in floor drains located in plenums or rooms that serve as air plenums. Prime as needed to ensure proper operation.	Semiannually
k. Check fan belt tension. Check for belt wear and replace if necessary to ensure proper operation. Check sheaves for evidence of improper alignment or evidence of wear and correct as needed.	Semiannually
l. Check variable-frequency drive for proper operation. Correct as needed.	Semiannually
m. Check for proper operation of cooling or heating coil for damage or evidence of leaks. Clean, restore, or replace as required.	Semiannually
n. Visually inspect outdoor air intake louvers, bird screens, mist eliminators, and adjacent areas for cleanliness and integrity; clean as needed; remove all visible debris or visible biological material observed and repair physical damage to louvers, screens, or mist eliminators if such damage impairs the item from providing the required outdoor air entry.	Semiannually
o. Visually inspect natural ventilation openings and adjacent areas for cleanliness and integrity; clean as needed. Remove all visible debris or visible biological material observed and repair physical damage to louvers, and screens if such damage impairs the item from providing the required outdoor air entry. Manual and/or automatic opening apparatus shall be physically tested for proper operation and repaired or replaced as necessary.	Semiannually
p. Verify the operation of the outdoor air ventilation system and any dynamic minimum outdoor air controls.	Annually
q. Check air filter fit and housing seal integrity. Correct as needed.	Annually
r. Check control box for dirt, debris, and/or loose terminations. Clean and tighten as needed.	Annually
s. Check motor contactor for pitting or other signs of damage. Repair or replace as needed.	Annually
t. Check fan blades and fan housing. Clean, repair, or replace as needed to ensure proper operation.	Annually
u. Check integrity of all panels on equipment. Replace fasteners as needed to ensure proper integrity and fit/finish of equipment.	Annually
v. Assess field serviceable bearings. Lubricate if necessary.	Annually
w. Check drain pans, drain lines, and coils for biological growth. Check adjacent areas for evidence of unintended wetting. Repair and clean as needed.	Annually
x. Check for evidence of buildup or fouling on heat exchange surfaces. Restore as needed to ensure proper operation.	Annually

* Minimum frequencies may be increased or decreased if indicated in the O&M manual.
** National Institute of Standards and Technology, U.S. Department of Commerce, Gaithersburg, MD.

TABLE 8.2 Minimum Maintenance Activity and Frequency for Ventilation System Equipment and Associated Components *(Continued)*

Inspection/Maintenance Task	Frequency*
y. Inspect unit for evidence of moisture carryover from cooling coils beyond the drain pan. Make corrections or repairs as necessary.	Annually
z. Check for proper damper operation. Clean, lubricate, repair, replace, or adjust as needed to ensure proper operation.	Annually
aa. Visually inspect areas of moisture accumulation for biological growth. If present, clean or disinfect as needed.	Annually
ab. Check condensate pump. Clean or replace as needed.	Annually
ac. Visually inspect exposed ductwork and external piping for insulation and vapor barrier for integrity. Correct as needed.	Annually
ad. Verify the accuracy of permanently mounted sensors whose primary function is outdoor air delivery monitoring, outdoor air delivery verification, or dynamic minimum outdoor air control, such as flow stations at an air handler and those used for demand-control ventilation. A sensor failing to meet the accuracy specified in the O&M manual shall be recalibrated or replaced. Performance verification shall include output comparison to a measurement reference standard consistent with those specified for similar devices in ASHRAE Standard 41.2 or ASHRAE Standard 111 [15].	5 years
ae. Verify the total quantity of outdoor air delivered by air handlers set to minimum outdoor air mode. If measured minimum airflow rates are less than the design minimum rate documented in the O&M manual, ± a 10% balancing tolerance, (1) confirm the measured rate does not conform with the provisions of this standard and (2) adjust or modify the air-handler components to correct the airflow deficiency. Ventilation systems shall be balanced in accordance with ASHRAE Standard 111 [15] or its equivalent, at least to the extent necessary to verify conformance with the total outdoor airflow and space supply airflow requirements of this standard. **Exception:** Units under 2000 cfm (1000 L/s) of supply air are exempt from this requirement.	5 years

* Minimum frequencies may be increased or decreased if indicated in the O&M manual.
** National Institute of Standards and Technology, U.S. Department of Commerce, Gaithersburg, MD.

APPENDIX B: ASHRAE 62.1 Minimum Ventilation Rates in Breathing Zone

TABLE 6.2.2.1 Minimum Ventilation Rates in Breathing Zone
(Table 6.2.2.1 shall be used in conjunction with the accompanying notes.)

	People Outdoor Air Rate R_p		Area Outdoor Air Rate R_a			Default Values			
						Occupant Density (see Note 4)	Combined Outdoor Air Rate (see Note 5)		
Occupancy Category	cfm/ person	L/s· person	cfm/ft²	L/s·m²	Notes	#/1000 ft² or #/100 m²	cfm/ person	L/s· person	Air Class
Correctional Facilities									
Cell	5	2.5	0.12	0.6		25	10	4.9	2
Dayroom	5	2.5	0.06	0.3		30	7	3.5	1
Guard stations	5	2.5	0.06	0.3		15	9	4.5	1
Booking/waiting	7.5	3.8	0.06	0.3		50	9	4.4	2
Educational Facilities									
Daycare (through age 4)	10	5	0.18	0.9		25	17	8.6	2
Daycare sickroom	10	5	0.18	0.9		25	17	8.6	3
Classrooms (ages 5–8)	10	5	0.12	0.6		25	15	7.4	1
Classrooms (age 9 plus)	10	5	0.12	0.6		35	13	6.7	1
Lecture classroom	7.5	3.8	0.06	0.3	H	65	8	4.3	1
Lecture hall (fixed seats)	7.5	3.8	0.06	0.3	H	150	8	4.0	1
Art classroom	10	5	0.18	0.9		20	19	9.5	2
Science laboratories	10	5	0.18	0.9		25	17	8.6	2
University/college laboratories	10	5	0.18	0.9		25	17	8.6	2
Wood/metal shop	10	5	0.18	0.9		20	19	9.5	2
Computer lab	10	5	0.12	0.6		25	15	7.4	1
Media center	10	5	0.12	0.6	A	25	15	7.4	1
Music/theater/dance	10	5	0.06	0.3	H	35	12	5.9	1
Multiuse assembly	7.5	3.8	0.06	0.3	H	100	8	4.1	1
Food and Beverage Service									
Restaurant dining rooms	7.5	3.8	0.18	0.9		70	10	5.1	2
Cafeteria/fast-food dining	7.5	3.8	0.18	0.9		100	9	4.7	2
Bars, cocktail lounges	7.5	3.8	0.18	0.9		100	9	4.7	2
Kitchen (cooking)	7.5	3.8	0.12	0.6		20	14	7.0	2

General									
Break rooms	5	2.5	0.06	0.3	H	25	7	3.5	1
Coffee stations	5	2.5	0.06	0.3	H	20	8	4	1
Conference/meeting	5	2.5	0.06	0.3	H	50	6	3.1	1
Corridors	—	—	0.06	0.3	H	—			1
Occupiable storage rooms for liquids or gels	5	2.5	0.12	0.6	B	2	65	32.5	2
Hotels, Motels, Resorts, Dormitories									
Bedroom/living room	5	2.5	0.06	0.3	H	10	11	5.5	1
Barracks sleeping areas	5	2.5	0.06	0.3	H	20	8	4.0	1
Laundry rooms, central	5	2.5	0.12	0.6		10	17	8.5	2
Laundry rooms within dwelling units	5	2.5	0.12	0.6		10	17	8.5	1
Lobbies/prefunction	7.5	3.8	0.06	0.3	H	30	10	4.8	1
Multipurpose assembly	5	2.5	0.06	0.3	H	120	6	2.8	1
Office Buildings									
Breakrooms	5	2.5	0.12	0.6		50	7	3.5	1
Main entry lobbies	5	2.5	0.06	0.3	H	10	11	5.5	1
Occupiable storage rooms for dry materials	5	2.5	0.06	0.3		2	35	17.5	1
Office space	5	2.5	0.06	0.3	H	5	17	8.5	1
Reception areas	5	2.5	0.06	0.3	H	30	7	3.5	1
Telephone/data entry	5	2.5	0.06	0.3	H	60	6	3.0	1
Miscellaneous Spaces									
Bank vaults/safe deposit	5	2.5	0.06	0.3	H	5	17	8.5	2
Banks or bank lobbies	7.5	3.8	0.06	0.3	H	15	12	6.0	1
Computer (not printing)	5	2.5	0.06	0.3	H	4	20	10.0	1
Freezer and refrigerated spaces (<50°F)	10	5	0	0	E	0	0	0	2
General manufacturing (excludes heavy industrial and processes using chemicals)	10	5.0	0.18	0.9		7	36	18	3
Pharmacy (prep. area)	5	2.5	0.18	0.9		10	23	11.5	2
Photo studios	5	2.5	0.12	0.6		10	17	8.5	1
Shipping/receiving	10	5	0.12	0.6	B	2	70	35	2
Sorting, packing, light assembly	7.5	3.8	0.12	0.6		7	25	12.5	2
Telephone closets	—	—	0.00	0.0		—			1
Transportation waiting	7.5	3.8	0.06	0.3	H	100	8	4.1	1
Warehouses	10	5	0.06	0.3	B	—			2

Public Assembly Spaces									
Auditorium seating area	5	2.5	0.06	0.3	H	150	5	2.7	1
Places of religious worship	5	2.5	0.06	0.3	H	120	6	2.8	1
Courtrooms	5	2.5	0.06	0.3	H	70	6	2.9	1
Legislative chambers	5	2.5	0.06	0.3	H	50	6	3.1	1
Libraries	5	2.5	0.12	0.6		10	17	8.5	1
Lobbies	5	2.5	0.06	0.3	H	150	5	2.7	1
Museums (children's)	7.5	3.8	0.12	0.6		40	11	5.3	1
Museums/galleries	7.5	3.8	0.06	0.3	H	40	9	4.6	1
Residential									
Dwelling unit	5	2.5	0.06	0.3	F,G, H	F			1
Common corridors	—	—	0.06	0.3	H				1
Retail									
Sales (except as below)	7.5	3.8	0.12	0.6		15	16	7.8	2
Mall common areas	7.5	3.8	0.06	0.3	H	40	9	4.6	1
Barbershop	7.5	3.8	0.06	0.3	H	25	10	5.0	2
Beauty and nail salons	20	10	0.12	0.6		25	25	12.4	2
Pet shops (animal areas)	7.5	3.8	0.18	0.9		10	26	12.8	2
Supermarket	7.5	3.8	0.06	0.3	H	8	15	7.6	1
Coin-operated laundries	7.5	3.8	0.12	0.6		20	14	7.0	2
Sports and Entertainment									
Gym, sports arena (play area)	20	10	0.18	0.9	E	7	45	23	2
Spectator areas	7.5	3.8	0.06	0.3	H	150	8	4.0	1
Swimming (pool & deck)	—	—	0.48	2.4	C	—			2
Disco/dance floors	20	10	0.06	0.3	H	100	21	10.3	2
Health club/aerobics room	20	10	0.06	0.3		40	22	10.8	2
Health club/weight rooms	20	10	0.06	0.3		10	26	13.0	2
Bowling alley (seating)	10	5	0.12	0.6		40	13	6.5	1
Gambling casinos	7.5	3.8	0.18	0.9		120	9	4.6	1
Game arcades	7.5	3.8	0.18	0.9		20	17	8.3	1
Stages, studios	10	5	0.06	0.3	D, H	70	11	5.4	1

GENERAL NOTES FOR TABLE 6.2.2.1

1 **Related requirements:** The rates in this table are based on all other applicable requirements of this standard being met.
2 **Environmental Tobacco Smoke:** This table applies to ETS-free areas. Refer to Section 5.17 for requirements for buildings containing ETS areas and ETS-free areas.
3 **Air density:** Volumetric airflow rates are based on dry air density of 0.075 lb_{da}/ft^3 (1.2 kg_{da}/m^3) at a barometric pressure of 1 atm (101.3 kPa) and an air temperature of 70°F (21°C). Rates shall be permitted to be adjusted for actual density.
4 **Default occupant density:** The default occupant density shall be used where the actual occupant density is not known.
5 **Default combined outdoor air rate (per person):** Rate is based on the default occupant density.
6 **Unlisted occupancies:** Where the occupancy category for a proposed space or zone is not listed, the requirements for the listed occupancy category that is most similar in terms of occupant density, activities, and building construction shall be used.

ITEM-SPECIFIC NOTES FOR TABLE 6.2.2.1

A For high-school and college libraries, the values shown for "Public Assembly Spaces—Libraries" shall be used.
B Rate may not be sufficient where stored materials include those having potentially harmful emissions.
C Rate does not allow for humidity control. "Deck area" refers to the area surrounding the pool that is capable of being wetted during pool use or when the pool is occupied. Deck area that is not expected to be wetted shall be designated as an occupancy category.
D Rate does not include special exhaust for stage effects such as dry ice vapors and smoke.
E Where combustion equipment is intended to be used on the playing surface or in the space, additional dilution ventilation, source control, or both shall be provided.
F Default occupancy for dwelling units shall be two persons for studio and one-bedroom units, with one additional person for each additional bedroom.
G Air from one residential dwelling shall not be recirculated or transferred to any other space outside of that dwelling.
H Ventilation air for this occupancy category shall be permitted to be reduced to zero when the space is in occupied-standby mode.

APPENDIX C: New York City Minimum Ventilation Rate Requirements

TABLE 403.3
MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE R_a CFM/FT^{2a}	DEFAULT OCCUPANT DENSITY #/1000 FT^{2a}	EXHAUST AIRFLOW RATE CFM/FT^{2a}
Correctional facilities				
Cells without plumbing fixtures	5	0.12	25	—
Cells with plumbing fixtures[g]	5	0.12	25	1.0
Dining halls (see food and beverage service)	—	—	—	—
Guard stations	5	0.06	15	—
Day room	5	0.06	30	—
Booking/waiting	7.5	0.06	50	—
Dry cleaners, laundries				
Coin-operated dry cleaner	15	—	20	—
Coin-operated laundries	7.5	0.06	20	—
Commercial dry cleaner[i]	30	—	30	—
Commercial laundry	25	—	10	—
Storage, pick up	7.5	0.12	30	—
Education				
Auditoriums	5	0.06	150	—
Corridors (see public spaces)	—	—	—	—
Media center	10	0.12	25	—
Sports locker rooms[g]	—	—	—	0.5
Music/theater/dance	10	0.06	35	—
Smoking lounges[b]	60	—	70	—
Day care (through age 4)	10	0.18	25	—
Classrooms (ages 5-8)	10	0.12	25	—
Classrooms (age 9 plus)	10	0.12	35	—
Lecture classroom	7.5	0.06	65	—
Lecture hall (fixed seats)	7.5	0.06	150	—
Art classroom	10	0.18	20	0.7
Science laboratories[g, k]	10	0.18	25	1.0
Wood/metal shops[g]	10	0.18	20	0.5
Computer lab	10	0.12	25	—
Multiuse assembly	7.5	0.06	100	—
Locker/dressing rooms[g]	—	—	—	0.25
Food and beverage service				
Bars, cocktail lounges	7.5	0.18	100	—
Cafeteria, fast food	7.5	0.18	100	—
Dining rooms	7.5	0.18	70	—
Kitchens (cooking)[b]	—	—	—	0.7
Hospitals, nursing and convalescent homes				
Autopsy rooms[b]	—	—	—	0.5
Medical procedure rooms	15	—	20	—
Operating rooms	30	—	20	—
Patient rooms	25	—	10	—
Physical therapy	15	—	20	—
Recovery and ICU	15	—	20	—
Hotels, motels, resorts and dormitories				
Multipurpose assembly	5	0.06	120	—
Bathrooms/toilet—private[g]	—	—	—	25/50[f]
Bedroom/living room	5	0.06	10	—
Conference/meeting	5	0.06	50	—
Dormitory sleeping areas	5	0.06	20	—
Gambling casinos	7.5	0.18	120	—

Lobbies/prefunction	7.5	0.06	30	—
Laboratories [j]				
Biological	—	1.0	—	1.0
Chemical	—	1.0	—	1.0
Industrial and nonteaching	—	1.0	—	1.0
Nonproduction chemical labs	—	1.0	—	1.0
Offices				
Conference rooms	5	0.06	50	—
Office spaces	5	0.06	5	—
Reception areas	5	0.06	30	—
Telephone/data entry	5	0.06	60	—
Main entry lobbies	5	0.06	10	—
Private dwellings, single and multiple				
Garages, common for multiple units[b]	—	—	—	0.75
Garages, separate for each dwelling[b]	—	—	—	100 cfm per car
Kitchens[k]	—	—	—	25/100[f]
Living areas[c,l]	0.35 ACH but not less than 15 cfm/person	—	Based upon number of bedrooms. First bedroom, 2; each additional bedroom, 1	—
Toilet rooms and bathrooms[g]	—	—	—	20/50[f]
Public spaces				
Corridors	—	0.06	—	—
Elevator car	—	—	—	1.0
Shower room (per shower head)[g]	—	—	—	50/20[f]
Smoking lounges[b]	60	—	70	—
Toilet rooms – public[g]	—	—	—	50/70[g]
Places of religious worship	5	0.06	120	—
Courtrooms	5	0.06	70	—
Legislative chambers	5	0.06	50	—
Libraries	5	0.12	10	—
Museums (children's)	7.5	0.12	40	—
Museums/galleries	7.5	0.06	40	—
Retail stores, sales floors and showroom floors				
Sales (except as below)	7.5	0.12	15	—
Dressing rooms	—	—	—	0.25
Mall common areas	7.5	0.06	40	—
Shipping and receiving	—	0.12	—	—
Smoking lounges[b]	60	—	70	—
Storage rooms	—	0.12	—	—
Warehouses (see storage)	—	—	—	—
Specialty shops				
Automotive motor-fuel dispensing stations[b]	—	—	—	1.5
Barber	7.5	0.06	25	0.5
Beauty and nail salons[b, h]	20	0.12	25	0.6
Embalming room[b]	—	—	—	2.0
Pet shops (animal areas)[b]	7.5	0.18	10	0.9
Supermarkets	7.5	0.06	8	—
Sports and amusement				
Disco/dance floors	20	0.06	100	—
Bowling alleys (seating areas)	10	0.12	40	—
Game arcades	7.5	0.18	20	—

Storage				
Repair garages, enclosed parking garages[b, d]	—	—	—	0.75
Warehouses	—	0.06	—	—
Theaters				
Auditoriums (see education)	—	—	—	—
Lobbies	5	0.06	150	—
Stages, studios	10	0.06	70	—
Ticket booths	5	0.06	60	—
Transportation				
Platforms	7.5	0.06	100	—
Transportation waiting	7.5	0.06	100	—
Workrooms				
Bank vaults/safe deposit	5	0.06	5	—
Darkrooms	—	—	—	1.0
Copy, printing rooms	5	0.06	4	0.5
Meat processing[c]	15	—	10	—
Pharmacy (prep. area)	5	0.18	10	—
Photo studios	5	0.12	10	—
Computer (without printing)	5	0.06	4	—

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508$m^3/(s\ m^2)$, °C = ((°F) -32) /1.8, 1 square foot = 0.0929 m^2.

a. Based upon net occupiable floor area.

b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited (see Section 403.2.1, Item 4).

c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.

d. Ventilation systems in enclosed parking garages shall comply with Section 404.

e. Rates are per water closet or urinal. The higher rate shall be provided where periods of heavy use are expected to occur, such as toilets in theaters, schools and sports facilities. The lower rate shall be permitted where periods of heavy use are not expected.

f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted where the exhaust system is designed to operate continuously during normal hours of use.

g. Mechanical exhaust is required and recirculation is prohibited.

h. For nail salons, the required exhaust shall include ventilation tables or other systems that capture the contaminants and odors at their source and are capable of exhausting a minimum of 50 cfm/ft^2 per station.

i. For R-2 buildings less than 125 feet in height, outdoor ventilation air provided by mechanical means serving dwelling units designed to exceed 100 cfm per dwelling unit, whether intermittent or continuous, shall be required. For buildings 125 feet and greater, outdoor ventilation air shall be provided by mechanical means when the sum of the exhaust designed to exceed 75 cfm, whether continuous or intermittent, per dwelling unit. Manually operated openable exterior wall openings shall not be used to provide outside ventilation air except where calculations are submitted showing that such openings are located at or below the lowest calculated neutral pressure plane (calculated at the winter outdoor design temperature, and taking into account a composite mass flow air balance of the building including all mechanical systems).

j. During unoccupied hours the ventilation rate and exhaust rates may be reduced to 0.5 cfm/ft^2.

k. When an educational science laboratory is occupied and hoods are not in use and hazardous materials are not present, then ventilation rates shall be consistent with actual use of the space, but not less than 0.5 cfm/ft^2.

l. See Section 502.6 for additional requirements.

APPENDIX D: Sample IPM Tracking Tool

DATE	RESPONSIBLE PARTY	LOCATION IN BUILDING	ACTIVITY PERFORMED (monitoring / observation, sanitation, application, etc.)	OBSERVED PEST TYPE	OBSERVED PEST DENSITY	PREVENTION MEASURES TAKEN PREVIOUSLY	PRODUCT APPLIED (name and active ingredients)	TOXICITY TIER (Tier 1, 2, or 3)	DATE & TIME OF PRODUCT APPLICATION	DATE & TIME OF OCCUPANT NOTIFICATION (required for Tier 1 or 2 products)	METHOD OF OCCUPANT NOTIFICATION (required for Tier 1 or 2 products)	EMERGENCY APPLICATION? (If yes, describe how the pest emergency threatened occupants or the building)

APPENDIX E: Sample Green Cleaning Tracking Tool

DATE	PURCHASING PARTY	Vendor	Invoice #	Product Type	Product Name/Manufacturer	Quantity	Cost Per Item ($)	Total Cost ($)	Sustainability Criteria? (YES/NO)	Sustainability Attribute	Material Cost with Sustainable Attribute

A. Total Materials and Products	$
B. Total Sustainable Materials and Products	$
Percentage Sustainable Materials and Products = (B/A)	%

APPENDIX F: ESRT HIGH PERFORMANCE DESIGN AND CONSTRUCTION GUIDELINES

EXHIBIT A

ESRT HIGH PERFORMANCE SUSTAINABLE HEALTHY DESIGN AND CONSTRUCTION GUIDELINES

Table of Contents:

A. General:

1. Smoking and vaping shall not be permitted anywhere indoors or outside the building, except in designated smoking areas located at least 25 feet (or the maximum extent allowable by local codes) from all entries, outdoor air intakes, and operable windows.

2. For the avoidance of any doubt, nothing contained in these ESRT High Performance Design and Construction Guidelines shall be construed to modify the provisions of Article 1 of this Lease or impair any of Landlord's consent rights pursuant to Article 8 of this Lease.

B. Energy Efficiency:

1. Exceed ASHRAE 90.1-2016 and IECC 2018 standards, meet or exceed NYStretch Energy Code 2020, meet or exceed 2020 NYC Energy Code and relevant successor codes.

2. Comply with Energy Star for Tenant Spaces requirements for design, construction and data sharing.

3. Cooperate with Landlord to follow and implement the Tenant Energy Optimization Process (TEOP) including development of an energy model using a DOE aligned program such as eQUEST or Trane Trace, during early schematic design and integration of recommended energy measures package into final design and construction.

4. The building standard is to provide 36 Channel Satec Meters in each electrical closet. This means 12 three phase loads can be metered by each Satec Meter, up to 36 single phase loads or a combination of 3, 2 and single phase loads. These meters shall meter the Tenants total electrical consumption through the use of Current Transformers (CTs) that are installed on the main feeds to the panel boards serving the tenant area. As a principal channel 1-12 shall be dedicated to the metering of the feeds to the main panel boards and sub-panel boards. Channels 13-36 will be used to monitor other categories as described below and the panel boards shall be designed in such a way to allow submetering through the use of CTs:

    a. The main panel boards shall be metered using CTs on the main feeds and these shall be connected to Channels 1 through 6 of the Sated Meter
    b. Lighting loads shall be served from a dedicated lighting panel, and the CTs shall be provided to meter the entire panel and connected to channels 7, 8 & 9 of the Satec Meter
    c. The MER panel boards serving AHUs, unit heaters, OAF, VAV and other control panels etc. shall be metered using CTs on the feed to the panel board connected to channels 10,11 & 12.
    d. Plug loads shall be metered using one CT per panel with plug loads grouped together on one panel, and separated from other loads that are to be metered. For example, if a panel has 30 plug load circuits and 5 non plug load circuits, the panel could get a CT and the 5 non-plug load circuits would get CTs to deduct non-plug loads from the panel total.
    e. IT server rooms, including CRAC, UPS, IT racks and outlets shall have individual circuits in panel to be provided with CTs or CT on feed to dedicated panel.
    f. Pantry, dishwasher, refrigerator/freezers, microwave, outlets shall have CTs per circuit or on feed to dedicated panel
    g. VFD driven motors with VFDs integrated shall be set up in the BMS with trending of motor kWh and kW points
    h. Hot water heaters shall have a CT on the circuit serving them

The final circuiting and channel numbers shall be defined in the design documentation and record drawings to ensure the metering tags are correct and accurately setup on the Satec System and the BMS.

C. Lighting:

1. Target LPD of 0.5W/SF or less. This can be achieved in most cases through efficient lighting design, use of low wattage fixtures and lamps and reflective surfaces as well as LED task lights.

2. Specify 100% LED lamps.

3. Implement lighting controls, including daylight dimming controls for all daylit areas and vacancy/occupancy sensors for all connected lighting load. Daylight-responsive controls shall be provided to control lighting within 15 feet of windows and under skylights.

4. Vacancy sensor controls shall be installed to control lights in enclosed offices, training rooms, conference/meeting/multipurpose rooms, copy/print rooms, lounges, employee lunch and break rooms, storage rooms, closets, other spaces enclosed by floor-to-ceiling height partitions. As per code the lights in the rooms shall be switched on by switch and go off after 15 min of no occupancy

5. Occupancy sensor (dual technology) controls shall be installed to control lights in open plan office areas and restrooms and to turn lights off after 15 minutes.

6. Provide a BACnet license for all new lighting control panels and any existing lighting control panels which have this capability and provide a connection to the BMS to communicate the status of the occupancy sensors and to allow a remote on/off cycling of the lights to refresh the lighting control panels in the event of 'freezing'. Co-ordinate with the HVAC layouts to ensure both lighting and HVAC zones align. Document occupancy sensor zone names on floor plans to allow automatic energy saving in the HVAC system using lighting system data.

7. Consider optimizing daylight and views for occupants, which may be achieved through a design that includes interior rather than perimeter offices or perimeter offices with glass fronts if perimeter offices are a design requirement.

8. Lighting calculations to demonstrate alignment with circadian rhythm and electric lights maintain illuminance equivalent melanopic lux of 150-300 at workstations (measured on the vertical plane facing forward four feet above the finished floor to simulate the view of the occupant).

9. Consider furniture partitions to be 42" or lower in height in order to allow for access to daylight and views. Additional privacy may be achieved through clear partition glass installed above the furniture panels.

10. Design and build to offer occupants control of lighting. Consider providing task lights with dimmers or at least three light levels (on/off/mid) at all workstations. Consider providing multi-zone controls in multi-occupant spaces (such as conference rooms) with at least three lighting levels or scenes.

11. Use light sources with a CRI of 90 or higher.

12. Consider providing manual or automatic glare control devices (shades or blinds) in all regularly occupied spaces.

D. HVAC – General

1. Calculations: As per NYC Energy Code and NYC Mechanical code the designer shall perform HVAC load calculations using an engineering software, for example Trane Trace. The loads and should be submitted as part of the DD and CD submission and the design input values should be summarized, including envelope, lighting, equipment, IT and loads per person on btu/sf.

2. Right size equipment based on efficient lighting and plug loads (as stated in the plug load section below target lighting load of 0.5 Watts per square foot and plug load of 80 Watts per workstation or less). Lighting loads in calculations shall be based on the actual lighting design. Equipment load assumptions shall be documented on a per workstation basis in individual workspace areas and on a per room basis for collaboration and break spaces.

3. Ventilation calculations shall be performed and the aggregate ventilation rate per square foot and supply air flow rate per square foot shall be reported. (ASHRAE 62)

4. The cooling coil shall be selected based upon the anticipated mixed air conditions and the ERV.

5. The design supply air flow rates should be calculated based upon the load model, and the airflow rates/sq ft shall be indicated on the drawings for each zone. Typically, the average supply air for the floor would not exceed 0.8 CFM/ sq ft excluding the IT rooms.

6. All HVAC systems design and efficiency levels shall exceed ASHRAE 90.1-2016 or IECC 2018, meet or exceed NYStretch Energy Code 2020, 2020 NYC Energy Code and relevant successor codes.

7. Air or waterside economizer to be provided on all new equipment and retrofitted to existing air-cooled DX systems serving the project area.

8. Modulating motorized outside air dampers and air flow measurement stations must be designed, installed, tied into the BMS and commissioned. Dampers must be AMCA leakage class 1A.

9. All sources of heating and cooling within a single space shall be controlled and interlocked together. For example, perimeter heating must be controlled using the perimeter heating output on a VAV box controller, air handling unit (AHU) or VRF control system etc. Any supplemental cooling systems, e.g., VRF fan coil systems, must have continuously synchronized heating and cooling setpoints with base building systems serving the same space. Having independent and uncoordinated controls for multiple systems within the same space is prohibited by this standard and energy code. Any existing systems within the project boundary shall be updated to meet this standard. All radiators must be tied into the same control system as the cooling system and fitted with modulating valves.

10. Where multiple HVAC zones exist within a single open area, the setpoints of each zone shall be synchronized to prevent simultaneous heating and cooling.

11. Zone controls shall automatically maintain a minimum 5F deadband between space cooling and heating setpoints. That is, if a space is set to 75F cooling and 70F heating and the occupant increases the heating setpoint to 72F, the cooling setpoint shall automatically be increased to 77F.

12. Where a single zone comprises multiple spaces, the spaces shall have similar loads and the same solar orientation. Do not combine, for example, north and east facing perimeter offices on the same zone. It is recommended that all individual offices and meeting/conference rooms are provided with individual VAV boxes and temperature sensors. Where this is not possible, and spaces are served by a common device (e.g., VAV box or FCU) provide variable airflow supply diffusers and individual temperature sensors in each space to allow a degree of individual temperature control. In this case the VAV box will be designed to maintain static pressure upstream of the variable airflow grilles.

13. Implement Demand Controlled Ventilation (DCV) for the space through the use of CO2 sensors or Indoor Air Quality (IEQ) sensors in densely occupied areas 250 square feet or larger, including meeting rooms. Sensors must be between 3 and 6 feet above the floor in open office areas. An IEQ sensor shall be provided in the RA duct to each AHU and be located away from mixed air/outside air intake. Specify a DCV sequence of operation at the zone level consistent with ASHRAE Guideline 36. The zone sensor in densely occupied spaces will increase VAV airflow and the zone sensors together the return air sensor will modulate the AHU OA flow between DCV minimum and design. DCV is recommended but not required for systems equipped with ERVs.

14. Consider installing an air purification system (such as AtmosAir) to reduce gas phase contaminants and biological contaminants in the air. If installing electronic air cleaning systems, ozone levels shall also be monitored in the space. Systems shall be listed to UL 2998 and UL 867.

15. Consider installing an IEQ sensors instead of CO2 or combination CO2, Humidity and Temperature Sensors, to measure and track the following parameters: CO2, PM2.5, TVOC, temperature, and relative humidity.

16. Ductwork design shall be streamlined. Plenum connections should have a minimum 4” 45 degree bevel/chamfer and 6” when transitioning to duct velocities greater than 1200 FPM. Plenum velocities shall not exceed 600 FPM. Bullheaded tees with boot taps on main branches shall not be used above 700 FPM in low pressure ductwork and are forbidden on medium pressure ductwork. The index medium pressure run shall not pass through any boot taps above 800 FPM. Boot taps for branches shall not be used above 1100 FPM main velocity. Mitered elbows with turning vanes shall not be used above 1400 FPM. To avoid system effects, mitered elbows with turning vanes or radiused elbows with splitter vanes shall be used when other fittings are within 5 diameters/characteristic dimensions downstream of an elbow. Higher duct velocities up to 2000 FPM are possible without impacting static pressure by using duct splits and radiused elbows with splitter vanes instead of boot taps.

17. Specify CFC and HCFC-free and low GWP refrigerants.

18. Install energy recovery ventilators (ERV) on ventilation systems to preheat and cool the outdoor air. Consider providing one ERV to serve 2 or more air handling units. Energy recovery systems shall be selected to meet minimum effectiveness requirements of energy code and so as to not impose a fan energy penalty under the fan system power limitations of ASHRAE 90.1-2016 as modified by the 2020 NYCECC or successor codes. ERVs shall be added for all projects where AHUs are replaced or relocated and wherever possible to replace outdoor air fans when AHUs are to be retained.

19. Provide temperature controls for all multi-occupant spaces, such as conference rooms. Provide automatic ventilation and temperature setback based on positive and automatic detection of vacancy. This can be accomplished through a communication link to the lighting control system or a dedicated occupancy sensor. When vacancy is detected, the VAV minimum flow for the zone shall temporarily reset to 0 cfm and the setpoint deadband shall increase by 2 °F. Upon detection of vacancy, the heating setpoint shall decrease by 1 °F and the cooling setpoint shall increase by 1 °F. When occupancy resumes, the reverse shall occur.

20. Ensure HVAC design specifications include operational set points and schedule to meet the most recent version of ASHRAE 55 requirements. Controls contractor to ensure set points are programmed; Commissioning Authority to verify.

21. Install BTU meters at the tenant point of connection to base building chilled water, heating hot water, and condenser water systems. Alternatively, they can be installed in each MER or AHU to capture all Tenant usage.

22. Provide return water temperature sensors for all chilled water, hot water, and condenser water equipment over 5 tons. Provide controls on water cooled DX systems which maintain a minimum 10F condenser/chilled water temperature rise during DX cooling operation and zero flowrate when the compressors are not operating. The DX free cooling coil and FCU cooling coils shall be selected for chilled water temperatures of 45/55 Degrees.

23. Documents shall specify that all duct probes and control raceway penetrating ductwork or air handler casing including internal partitions in air handlers shall be externally AND internally sealed airtight. Holes in walls behind all wall mounted control devices regardless of where they are mounted or what parameter they are sensing shall be sealed airtight.

24. The pressure drop through all chilled water coils (e.g., CRAC free cooling coils, AHUs, FCU, condensers) and associated piping and accessory shall not exceed building standards. Chilled water coils and other loads connected to the chilled water system shall not exceed a pressure drop of 5 ft of water. Provide means of measuring and balancing the chilled water, hot water and condenser water to all equipment. All control valves shall be pressure independent type or have balancing valves with calibrated orifices and memory stops. Where pressure independent valves are used, a calibrated orifice is still required for flow measurement and verification. Electronic pressure independent control valves are acceptable for this purpose. Quarter turn balancing valves are not acceptable. Automatic flow limiting valves are not acceptable. If equipment is not available that meets available systems pressures, the designer shall include a variable speed booster pump in series with the modulating control valve serving the equipment.

25. Three way valves are not permitted on any chilled water, hot water, dual water temperature, or condenser water loads. Any three way valves on existing equipment planned to remain as part of the project shall be replaced with two-way valves. All flow control shall be modulating with two way valves. Water blending systems for chilled beams, radiant cooling, and condenser water loads connected to a chilled water system shall use two way valves to control delivery of chilled water supply together with a local circulator pump. The Cv of valves supplying such blending systems shall be properly selected. Such systems may also incorporate a three-way valve or local injection pump to make use of chilled water returning from AHU coils within the project boundary and outboard of valved connections to chilled water mains, but such piping must be configured with check valves as required to prevent chilled water supply water from being connected directly to chilled water return lines.

26. IT Server Room Requirements:
    a) Wherever possible, cooling shall be configured with separate hot and cold aisles. All return air shall come from within or overhead of hot aisles, and all cooling shall be supplied into cold aisles at or below the top of racks using radial/laminar flow diffusers, perforated duct, or fabric ducts. In row cooling units, rack door cooling, and rack top cooling units will satisfy this requirement. Console units, wall mounted units and other non-ducted units should not be used.
    b) All IT equipment shall have air intakes directed to cold aisles and hot air discharges directed to hot aisles.
    c) All temperature sensors used to control cooling equipment in IT rooms shall be located in cold aisles, preferably with averaging sensors located on rack doors and shall be set to no less than 78 F.
    d) Doors, heavy curtains, or other air barriers shall be installed extending from the tops of racks to the finished floor between the end of racks and IT room walls to maintain hot and cold aisle separation.
    e) All unused spaces in equipment racks shall be fitted with blanking panels.
    f) IT rooms primarily used for network switching equipment and associated uninterruptible power supplies shall be cooled by transferring air from occupied space into the cold aisle and from the hot aisle to the AHU return air duct with a thermostatically controlled transfer fan. Do not provide DX cooling for such rooms without identifying a unique need based on published equipment operating requirements.
    g) Provide sealed walls floor to slab to ensure air tightness within the IT server rooms and other spaces with supplemental cooling. All pipe, duct and cable penetrations shall be sealed. Provide insulation in the partitions.

27. HVAC General Equipment Specifications:
    a) VAV chilled water AHUs shall have the following features: directly driven airfoil plenum fans, 4" deep filter rack MERV 13, stainless steel drain pan, tool free access, safety catches on access doors. For airflows less than 10000 CFM AAON V3 series AHUs may be used to save space. Otherwise, modular units from JCI, Trane, Carrier, or Nortek shall be used.
    b) Water-cooled DX units shall be Mammoth V-Cube, Daikin SWP or Trane Modular and shall have shell-and-tube condensers with control valves per circuit and water economizer coils. Water side pressure drops must not exceed the available differential pressure.
    c) VRF equipment shall be Mitsubishi, Samsung, Daikin, LG, Fujitsu, Hitachi or approved equal performance, and shall be provided with a BACnet interface for monitoring.
    d) ERVs may be separate from the AHU or integrated within the AHU. ERVs shall be Semco FV, Greenheck ERV; shall be from the modular AHU line of JCI, Trane, Carrier, or Nortek. A single ERV may be used to serve 2 AHUs. ERV wheels shall have effectiveness ratings that meet the fan system power exemption in ASHRAE 90.1-2016 or successor standards. ERV fans shall be variable speed and air flow monitoring shall be provided in exhaust and supply ducts by way of VAV boxes at each AHU if airflow is controlled independently for each AHU or can be provided at the ERV intake and exhaust ducts if airflow is manually balanced for each AHU. Provide MERV 8 filters on the outdoor intake and exhaust air before the wheel/heat exchanger.

E. HVAC – Building Specific Requirements

Empire State Building:

New

a) Building standard VAV air handling unit (AHU) with chilled water coil and associated low and medium pressure ductwork with VAV boxes. Add heating coils to VAV boxes. Heating coils shall be sized for 115/105°F. Pipe all new hot water coils to base building low temperature hot water riser.
b) Provide modulating electronic control of existing steam radiators through VAV controllers and tie into base building BMS.
c) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
d) Supplemental units shall be water-cooled DX with chilled water coil. Chilled water coil shall be piped with a modulating valve for discharge air control. DX condenser shall be piped in bypass on the return with a dedicated circulator. Series piping of coil and condenser shall not exceed building standard CHW AHU pressure drop and shall provide modulating water flow in both DX and CHW modes of operation.

Renewal/Retrofit

a) Building standard VAV air handling unit (AHU) with chilled water coil and associated low and medium pressure ductwork with VAV boxes.
b) Where ductwork and VAV boxes are being replaced, add heating coils to VAV boxes. Where no HVAC fit-out work is planned, add heating coil to AHU. Heating coils shall be sized for 115/105°F. Pipe all new hot water coils to base building low temperature hot water riser.
c) Provide modulating electronic control of existing steam radiators through VAV controllers and tie into base building BMS.
d) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
e) Supplemental units shall be water-cooled DX with chilled water coil. Chilled water coil shall be piped with a modulating valve for discharge air control. DX condenser shall be piped in bypass on the return with a dedicated circulator. Series piping of coil and condenser shall not exceed building standard CHW AHU pressure drop and shall provide modulating water flow in both DX and CHW modes of operation.

1333 Broadway:

New

a) Air conditioning systems shall be air-cooled VRF with condensing units located in an appropriately insulated and waterproofed MER room within the tenant area. Subject to landlord's approval, tenant may locate condensing units in an area to be designated by landlord on the roof with interconnecting piping and wiring to be routed as per landlord's direction.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
c) Provide modulating control of existing steam radiators through the VRF fan coil controllers or independent zone controllers and tie into base building BMS.
d) Supplemental cooling shall be provided by VRF units.

Renewal/Retrofit

a) Any existing to remain constant volume units must be converted to single zone VAV or multi-zone VAV systems as necessary for code compliance. Constant volume control will not remain.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
c) Provide modulating control of existing steam radiators through independent zone controllers and tie into base building BMS.
d) Existing supplemental units may remain until the suite is converted to VRF.

1350 Broadway:

New

a) Building standard VAV air handling unit (AHU) with chilled water coil and associated low and medium pressure ductwork with VAV boxes. Constant volume control will not remain. Remove and replace all air-cooled DX units with chilled water VAV AHUs.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
c) Provide modulating electronic control of existing steam radiators through VAV controllers and tie into base building BMS.
d) Supplemental cooling shall be provided by exhaust fans where cooling load permits. If there is a need for more cooling than an exhaust fan can provide, an air-cooled DX unit may be installed.

Renewal/Retrofit

a) Building standard VAV air handling unit (AHU) with chilled water coil and associated low and medium pressure ductwork with VAV boxes.
b) Existing to remain constant volume units must be converted to single zone VAV or multi-zone VAV systems as necessary for code compliance. Constant volume control will not remain.
c) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
d) Provide modulating electronic control of existing steam radiators through VAV controllers and tie into base building BMS.
e) Supplemental cooling shall be provided by exhaust fans where cooling load permits. If there is a need for more cooling than an exhaust fan can provide, an air-cooled DX unit may be installed.

1359 Broadway:

New

a) Air conditioning systems shall be air-cooled VRF with condensing units located in an appropriately insulated and waterproofed MER room within the tenant area.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
c) Provide modulating control of existing steam radiators through the VRF fan coil controllers or independent zone controllers and tie into base building BMS.
d) Supplemental cooling shall be provided by VRF units.

Renewal/Retrofit

a) Any existing to remain constant volume units must be converted to single zone VAV or multi-zone VAV systems as necessary for code compliance. Constant volume control will not remain.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
c) Provide modulating control of existing steam radiators through independent zone controllers and tie into base building BMS.
d) Existing supplemental units may remain until the suite is converted to VRF.

501 7th Avenue:

New (Floors 2-4)

a) Building standard self-contained water-cooled DX VAV air conditioning units (AHUs) with associated low and medium pressure ductwork with VAV boxes.

b) Add heating coils to VAV boxes. Heating coils shall be sized for 120/110 °F. Pipe all new hot water coils to on-floor water to water heat pump (WWHP). Where WWHP has not yet been installed, provide a new WWHP tied into the base building condenser water system to generate low temperature hot water for the floor.
c) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
d) Provide modulating electronic control of existing steam radiators through VAV controllers and tie into base building BMS.
e) Supplemental units shall be water-cooled DX tied into the existing condenser water loop with water-side economizer.

<u>New (Floors 5 and Above)</u>

a) Building standard self-contained water-cooled DX VAV air conditioning units (AHUs) with associated low and medium pressure ductwork with VAV boxes.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
c) Provide modulating electronic control of existing steam radiators through VAV controllers and tie into base building BMS.
d) Supplemental units shall be water-cooled DX tied into the existing condenser water loop with water-side economizer.

<u>Renewal/Retrofit</u>

a) Building standard self-contained water-cooled DX VAV air conditioning units (AHUs) with associated low and medium pressure ductwork with VAV boxes. Existing to remain constant volume units must be converted to single zone VAV or multi-zone VAV systems as necessary for code compliance. Constant volume control will not remain.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
c) Provide modulating electronic control of existing steam radiators through VAV controllers and tie into base building BMS.
d) Supplemental units shall be water-cooled DX tied into the existing condenser water loop with water-side economizer.

1400 Broadway:

<u>New</u>

a) New air conditioning systems shall be air cooled VRF with condensing units located in an appropriately insulated and waterproofed MER room within the tenant area.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
c) Provide modulating control of existing steam radiators through the VRF fan coil controllers or independent zone controllers and tie into base building BMS.
d) Supplemental cooling shall be provided by VRF units.

<u>Renewal/Retrofit</u>

a) Building standard self-contained water-cooled DX VAV air conditioning units (AHUs) with associated low and medium pressure ductwork with VAV boxes. Existing to remain constant volume units must be converted to single zone VAV or multi-zone VAV systems as necessary for code compliance. Constant volume control will not remain.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
c) Provide modulating electronic control of existing steam radiators through VAV controllers and tie into base building BMS.
d) Supplemental units shall be water-cooled DX tied into the existing condenser water loop with water-side economizer.

250 W 57th Street:

New

a) Air conditioning systems shall be chilled water systems at the end of equipment life. Building standard VAV air handling unit (AHU) with chilled water coil and associated low and medium pressure ductwork with VAV boxes. Remove and replace all air-cooled DX units with chilled water VAV AHUs.
b) Add heating coils to VAV boxes. Heating coils shall be sized for 120/110 °F. Pipe all new hot water coils to base building low temperature hot water riser.
c) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
d) Provide modulating electronic control of existing steam radiators through VAV controllers and tie into base building BMS.
e) Supplemental units for year-round operation shall be water-cooled DX with chilled water coils. Chilled water coil shall be piped with a modulating two-way valve for discharge air control. DX condenser shall be piped in bypass on the return with a dedicated circulator. Series piping of coil and condenser shall not exceed building standard CHW AHU pressure drop and shall provide modulating water flow in both DX and CHW modes of operation.
f) Supplemental units which do not require operation during cooler weather after hours or cold winter weather may be CHW only, however cooling will not be available when the building's chilled water loop is in overnight heating mode. The pressure drop shall match building standard CHW unit pressure drop and the control valve shall provide modulating flow.

Renewal/Retrofit

a) Air conditioning systems shall be chilled water systems at the end of equipment life. Building standard VAV air handling unit (AHU) with chilled water coil and associated low and medium pressure ductwork with VAV boxes. Any existing to remain constant volume units must be converted to single zone VAV or multi-zone VAV systems as necessary for code compliance. Constant volume control will not remain.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust.
c) Where ductwork and VAV boxes are being replaced, add heating coils to VAV boxes. Heating coils shall be sized for 120/110 °F. Pipe all new hot water coils to base building low temperature hot water riser.
d) Provide modulating electronic control of existing steam radiators through VAV controllers and tie into base building BMS.
e) Supplemental units for year-round operation shall be water-cooled DX with chilled water coils. Chilled water coil shall be piped with a modulating valve for discharge air control. DX condenser shall be piped in bypass on the return with a dedicated circulator. Series piping of coil and condenser shall not exceed building standard CHW AHU pressure drop and shall provide modulating water flow in both DX and CHW modes of operation.
f) Supplemental units which do not require operation during cooler weather after hours or cold winter weather may be CHW only, however cooling will not be available when the building's chilled water loop is in overnight heating mode. The pressure drop shall match building standard CHW unit pressure drop and the control valve shall provide modulating flow.

One Grand Central Place:

New (Floors 1-47)

a) Air conditioning systems shall be air-cooled VRF with condensing units located in an appropriately insulated and waterproofed MER room within the tenant area. Subject to landlord's approval, tenant may locate condensing units in an area to be designated by

landlord on the roof with interconnecting piping and wiring to be routed as per landlord's direction.

b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust. Consider electronic air cleaning (bipolar ionization).
c) Provide modulating control of existing steam radiators through the VRF fan coil controllers or independent zone controllers and tie into base building BMS.
d) Supplemental cooling shall be provided by VRF units.

New (Floors 48-55)

a) Building standard VAV air handling unit (AHU) with chilled water coil and associated low and medium pressure ductwork with VAV boxes.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust. Consider electronic air cleaning (bipolar ionization).
c) Where ductwork and VAV boxes are being replaced, add heating coils to VAV boxes. Heating coils shall be sized for 120/110 °F. Pipe all new hot water coils to base building corridor chiller riser. Provide modulating electronic control of existing steam radiators through VAV controllers and tie into base building BMS.
d) Supplemental cooling shall utilize chilled water. BTU metering is recommended if cost allocation associated with after-hours usage is required.

Renewal/Retrofit

a) Any existing to remain constant volume units must be converted to single zone VAV or multi-zone VAV systems as necessary for code compliance. Constant volume control will not remain.
b) Provide an energy recovery ventilator (ERV) on outdoor air and exhaust. Consider electronic air cleaning (bipolar ionization).
c) Provide modulating control of existing steam radiators through independent zone controllers and tie into base building BMS.
d) Existing supplemental units may remain until the suite is converted to VRF.

111 West 33rd Street:

New & Renewal/Retrofit

a) Air conditioning shall be provided by chilled water VAV systems. Building standard for interior zones is VAV air handling units with dual temperature (heating/cooling) coil and associated low and medium pressure ductwork with VAV boxes.
b) Perimeter zones shall be heated and cooled by two-pipe induction units which are served by served by constant volume air handling units. Any existing induction units which lack motorized control valves shall be retrofit with same.
c) Where space permits in existing MERs, provide an energy recovery ventilator (outdoor air and exhaust) for AHUs.
d) Supplemental cooling may be provided using water-cooled DX units tied into the condenser water loop with water-side economizer. DX units shall be provided with two position control valves which shall close when the DX system cycles off and shall have two-way head pressure control valves which modulate flow when the DX system cycles on.

F. Plug Loads:

1. ESRT's standard Load Letter form shall be utilized and completed for ESRT review prior to CD phase.

2. Specify equipment and appliances including, without limitation: computers, monitors, printers, refrigerators, dishwashers, water coolers, food service and pantry equipment, copiers, and A/V and IT equipment that meet or exceed ENERGY STAR and California Energy Commission's latest appliance standards.

3. Implement automatically controlled plug load management strategies including occupancy sensors, outlet-based controls, circuited controls, and/or software programs for all 120 volt 15- and 20-amp receptacles in the space other than and critical loads that must be highlighted in the design, for example, receptacles for refrigerators, and dishwashers. Equipment and receptacles may be controlled through software-based technology and must be visually marked to differentiate from controlled receptacles. For pre-built spaces without FF&E, tenant FF&E packages shall be reviewed for compliance with this requirement.
4. Enable sleep/hibernate mode on all equipment. Computers are enabled for overnight software updates in this mode.

5. Target IT equipment loads or less than 80W per workstation average demand during operating hours.

6. Ensure Video Displays and Screens are scheduled to turn off during non-occupied periods.

G. Water Efficiency:

1. Specify WaterSense fixtures for any fixture type that is eligible.

2. Specify fixtures having the following maximum flush/flow rates:
   a) Water closet flush volume 1.28 GPF
   b) Urinal flush volume is 0.125 GPF
   c) Pantry sink flow rate is 1.0 GPM and include specification for an aerator
   d) Lavatory faucet flow rate is 0.35 GPM.
   e) Shower flow rate is 1.5 GPM.

3. Install under counter, point of use hot water heaters or wherever possible heat pump water heaters. Hot water recirculation systems shall be extended to all lavatory stop valves and within 10 piping feet of stop valves for sinks and showers. Recirculation systems shall be controlled based on recirculation line temperature and occupancy detection in spaces with fixtures.

H. Materials and Resources:

1. Provide dedicated clearly labeled areas for the collection and storage of recyclable materials.

2. Recyclable materials must include mixed paper, corrugated cardboard, glass, plastics, and metals. Take appropriate measures for the safe collection, storage, and disposal of batteries, mercury-containing lamps, and electronic waste. All eligible materials must be properly disposed of in receptacles labeled per NYC Department of Sanitation regulations. Post educational signs in common areas routinely visited to educate employees on requirements.

3. Specify recycled content materials whenever possible, which may include, without limitation, gypsum board, acoustical tiles, carpet and carpet backing.

4. Specify regionally produced and extracted materials (within a 500-mile radius) whenever possible.

5. Specify rapidly renewable resources whenever possible, such as bamboo, wool, linoleum and cork.

6. Specify and use wood products certified by the Forest Stewardship Council (FSC).

7. Specify products that have Environmental Product Declarations (EPD).

8. Specify products that have Health Product Declarations (HPD), Cradle-to-Cradle certification, or Declare labels.

9. Specify and install low-emitting (low or no Volatile Organic Compounds) wet-applied products, including adhesives, sealants, paints, and coatings. Wet-applied products should be Greenguard Gold certified.

10. Specify and install low-emitting flooring systems. Flooring products should be certified by either CRI Green Label Plus (carpet) or FloorScore (resilient flooring).

11. Specify and install low-emitting ceiling systems. Ceiling systems should be Greenguard Gold certified.

12. Specify and install low-emitting systems furniture and seating.

13. Specify and install composite wood and agrifiber products, including particleboard, MDF, veneer plywood, and plywood to meet EPA TSCA Title VI or California Air Resources Board (CARB) ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins (NAF).

14. Do not specify materials listed on the International Living Future Institute Red List: https://living-future.org/declare/declare-about/red-list/

I. Contractor Guidelines:

1. Abide by all specification requirements in sections above and below.

2. Develop and implement a construction waste management plan at least as rigorous as ESRT's Construction Waste Management Plan.

3. Divert construction waste from landfills through methods such as material reuse, source-separated recycling, purchasing to reduce packaging, manufacturer take-back programs and donation programs.

4. Achieve minimum 50% total waste diversion and aim to achieve 75%. Include target recycling and diversion percentages and monthly diversion reporting in waste hauler contracts. Monthly waste diversion records by weight to be provided to ESRT.

5. Implement Construction Indoor Air Quality Management Plans during performance of work and prior to occupancy to minimize the presence and spread of air pollutants.

6. Implement strategies for HVAC protection, source control, pathway interruptions, housekeeping, and scheduling at least as rigorous as those detailed in ESRT's Construction Indoor Air Quality Management Plan.

7. Consider conducting indoor air quality testing after construction is complete and prior to occupancy to demonstrate that contaminant maximum concentrations are not exceeded. At a minimum, testing should be conducted for CO2 and TVOC concentrations.

J. Testing and Commissioning:

1. A third party commissioning agent shall perform commissioning of energy systems within the tenant space or installed as part of the tenant's lease agreement including, without limitation, lighting, lighting controls, HVAC systems, BMS (including, but not limited to, VFDs, CO2 sensor calibration and DCV BMS and OA tie-in, motorized OA damper tied into DCV and BMS, static pressure or discharge air temperature reset, supply and return air setback schedules, air and water side economizers), Testing and Balancing of air and hydronic systems, functional testing of applicable equipment, and electrical to ensure design optimizes performance and systems are constructed and function per efficient design.

2. A commissioning report shall be submitted to ESRT for review prior to occupancy of the space, and whenever ESRT requests throughout the Term (no more than annually with a target of every 3-5 years), and shall include, but not be limited to, all systems listed above. See below for specific commissioning requirements:

   a) All batteries in existing wireless sensors and devices shall be replaced during the fitout
   b) Any existing temperature sensors and CO2 sensors that are to be retained as part of the fitout/renovation shall be checked for calibration with a PE certified report of results
   c) Outdoor air dampers shall be verified for correct operation and tight shutoff upon completion of the works, including existing dampers
   d) Verify all individual offices, conference rooms have been provided with independent controls and that the corresponding sensors and controls have been point to point tested
   e) Verify that the perimeter radiator valves are functioning correctly and that they are being controlled by the correct VAV box and zone temperature sensor
   f) Verify the panel boards have the correct schedules, and that the CTs have been installed correctly and are displaying with the correct references (load type, board reference) in the Satec and BMS system.
   g) Verify that water detection and isolation valves have been installed on all chilled water and heating water supply and return pipes to each MER
   h) Confirm the design flowrate from the AHUs and ERVs and measure the static pressure within the duct at the design flowrate to ensure this is the value entered into the BMS and not a default or random value.
   i) Verify the maximum and minimum flowrates for the VAV boxes have been setup in the BMS as per the design drawing
   j) Confirm the location of the temperature sensor/controllers in the IT room is in the cold aisle located out of the airstream
   k) Measure the lighting levels within the spaces and ensure that the light outputs of each fitting has been adjusted to achieve (not exceed) the designed lighting level.
   l) Verify the lighting zones are as per the design and that the daylight harvesting has been enabled and is working
   m) Verify the time schedule has been setup for any lighting zone that is not controlled by occupancy sensors

n) Verify the lighting control system has been connected to the BMS and that the occupancy status is being used to control HVAC setback
o) The manufacturer shall commission the Ionization system to ensure it is installed and functioning correctly and that the correct level of output has been set. Measurements shall be taken of the air quality to verify its operation.

APPENDIX G: Climate Change Risk Assessment Checklist

Complete the checklist below for each property. For every "No" answer, incorporate missing risk evaluations into the next risk assessment performed for the property and consider incorporating the missing resilience measures in the capital improvement plan for the property.

Energy Supply

Has the site of the building been assessed to identify any potential increase in energy costs relating to climate change?

□ Yes □ No □ N/A

Are there any state or local incentives, programs, or initiatives that support on-site renewable energy generation?

□ Yes □ No □ N/A

Has the site of the building been assessed to identify any potential risk of power loss and/or is the building in an area prone to loss of power?

□ Yes □ No □ N/A

In the event of unplanned power loss, does the building have access to back-up power to maintain minimum and life-safety operations?

□ Yes □ No □ N/A

Flooding (Storm surges, flash flooding, sea level rise)

Has the site of the building been assessed to identify any potential flood risk and/or is the building in a flood zone?

□ Yes □ No □ N/A

If at risk, have the building and site been assessed to identify potential damage from flooding?

□ Yes □ No □ N/A

If at risk, do the building and site have measures in place to mitigate the damage from flooding?

□ Yes □ No □ N/A

If at risk, does the building have mechanical and electrical equipment located in areas that are not at significant risk for flooding, such as on upper floors or on rooftops?

□ Yes □ No □ N/A

Heatwaves

Has the site of the building been assessed to identify any potential heatwave risk and/or is the building in an area prone to heatwaves?

□ Yes □ No □ N/A

If at risk, has the site been assessed to identify potential damage from heatwaves (mechanical equipment, infrastructure, landscape, etc.) and impact on residents?

□ Yes □ No □ N/A

Hurricanes

Has the site of the building been assessed to identify any potential hurricane risk and/or is the building in an area prone to hurricanes?

□ Yes □ No □ N/A

If at risk, has the building(s) and site been assessed to identify potential damage from hurricanes?

□ Yes □ No □ N/A

If at risk, is the structural load of the building(s) meeting local building code for hurricanes?

□ Yes □ No □ N/A

If at risk, do the building and site have measures in place to mitigate damage from hurricanes, such as impact-resistant windows, concrete building façades, mature and deep-rooted native trees with minimal leaf coverage (if trees are present), etc.?

□ Yes □ No □ N/A

Regulatory

Is the building subject to any regulatory risks, such as mandatory energy/carbon disclosures, carbon tax, extreme volatility in energy due to regulation, new codes (building, site, energy, etc.)?

□ Yes □ No □ N/A

If at risk, has the building met all relevant green local laws and energy/GHG compliance regulations?

□ Yes □ No □ N/A

Winter Storms

Has the site of the building been assessed to identify any potential winter storm (blizzards, Nor'easters) risk and/or is the building in an area prone to winter storms?

□ Yes □ No □ N/A

If at risk, have the building and site been assessed to identify potential damage from winter storms?

□ Yes □ No □ N/A

If at risk, is the structural load of the building meeting local building code for winter storms (capacity for snow/ice on roof load, etc.)?

□ Yes □ No □ N/A

If at risk, do the building and site have measures in place to mitigate damage from winter storms, such as snow and ice removal procedures, insulated water piping, etc.?

□ Yes □ No □ N/A

Appendix H: Energy Management Plan

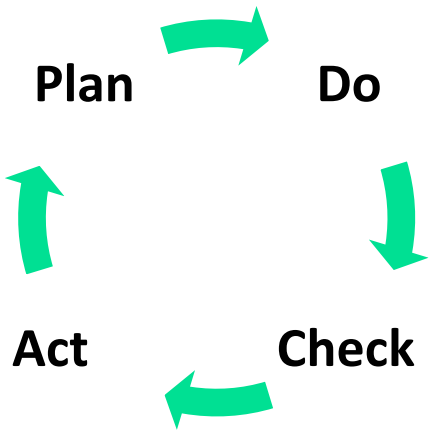
See pages below for a property energy management plan template. The intent of the template is to be used as an overall guidance document; the final plan can be customized with sections added and deleted to best fit the intended audience and the property team's needs.

PREFACE TO THE ENERGY MANAGEMENT PLAN TEMPLATE:

Environmental concerns and the need to be globally competitive are providing a driving force for local industry to change the way energy use and energy costs are viewed. Rather than being an inevitable cost of doing business, energy is now considered to be a manageable input to the process, much like any raw material or other resource cost.

The first step in managing energy costs is creating an energy management plan. This document contains a template that lays out a logical format for capturing information critical to energy management planning. It formalizes the thought process involved in understanding the relative magnitude of energy costs, the possible ways to reduce energy use, energy targets that are likely to be achievable, and other associated activities that need to occur. While stand-alone energy management projects are satisfying to complete, the energy management plan provides the "big picture" view as an ongoing framework for optimizing overall energy use and achieving success.

Energy management planning is intended to be a process of "continuous improvement". A closed-loop feedback approach is most effective in demonstrating results that will justify further investment in efficiency. The following diagram shows the circular steps that are recommended for adoption into the planning process:



Plan: Create the energy management plan ensuring budgets, resources, are timelines established to meet the targets and objectives of the plan. Include tracking and monitoring processes within the plan to ensure effective reporting to management.

Do: Execute the plan by deploying the resources and budgets, prepare status reports, and implement the communication strategy.

Check: Measure and monitor performance of projects and programs against the desired outcomes as planned and report to management. with recommendations for improvements and course corrections.

Act: Analyze the variances to the plan and their causes. Recommend improvements, course corrections, and modifications to the plan.

It is important that the scope of the plan includes all energy sources such as electricity, natural gas, and fuel oil in order to have a complete understanding of opportunities for energy cost reduction.

EXECUTIVE SUMMARY:

Provide an overview of the plan in a few paragraphs.>

Ideas to include:

Specification of the energy plan targets and objectives over an appropriate planning time horizon.

The baseline energy usage and energy intensity of the property compared to industry average (use national median EUI for property as shown in ENERGY STAR Portfolio Manager), energy flows of the energy use identifying major energy using equipment.

Top 3 to 5 high-potential energy conservation capital projects with estimated savings, incentives, capital costs and timelines.

A brief outline of medium-term strategic energy management activities planned.

Communication strategy and employee awareness programs.

Include summary table(s) of relevant numbers for current energy performance, targets, projects etc.>

ENERGY PLAN INFORMATION:

- Date of report
- Author
- Acknowledgement of key staff involved
- Property name and address

BACKGROUND:

<Describe the plant operations and factors that affect energy use. Some ideas for inclusion here are:

Business overview:

description of business history and current structure (at parent and local level, ownership, etc.); and

review of the industrial sector the business operates in with reference to the NAICS coding system and a summary of key business concerns facing the business and sector.

Process descriptions.

Physical location and access to resources.

List specifics of past conservation projects and successes.

Describe any existing metering/monitoring systems.

List past energy and feasibility studies.

Key challenges and constraints to achieving energy reduction goals (resources, capital, expertise, corporate commitment, data, etc.).>

ENERGY MANAGEMENT POLICY & BEST PRACTICES:

<State your company's energy policy here, if one currently exists. An example energy management policy would be:

"The XYZ Co. will endeavor to reduce energy consumption through all available means so that by 2014 our total energy usage will be 15% less (or, for each unit of material produced) than 2010".

Otherwise, strive to use this plan to generate management acceptance of the importance of energy planning and create a formal energy policy. State a target timeline here for energy policy creation.>

Does the company:

- have broad awareness of the benefits of energy efficiency
- collect and utilize information to manage energy use
- integrate energy management into their overall management structure
- provide leadership on energy management through dedicated staff and a committed energy efficiency policy
- have an energy management plan for the short and long terms
- have a procurement policy that favors energy efficient equipment and materials

ENERGY TEAM:

<State here if there is an existing energy manager for the company or the property. If not, name an overall energy champion or one specific to the property. Tabulate all individuals that have an impact on energy use and potential energy projects, identifying whether it is their basic job function or if they are co-champions for this effort (i.e. Dan in purchasing will need to be included in planning conservation projects, Rick in engineering is very interested in contributing to energy conservation projects and is a future energy champion).>

<List all personnel with Knowledge and experience in energy management from operations, maintenance, engineering, etc.>

<The importance of having a senior executive as a regular participant and sponsor of the energy team is highly recommended. This ensures that the executive management team is well informed of ongoing projects and progress toward energy management goals. If this person is or becomes an energy champion, the energy team is well on its way to achieving great success.>

The Energy Team at XYZ Co.

Name	*Position*	*Energy Champion?*	*Percent of Time on Energy Team*
Name 1	Property Manager	Yes	30%
Name 2	Portfolio Manager	Yes	5%
Name 3	Building Maintenance	No	10%

ENERGY BASELINE:

<This section requires some basic data gathering and thought about the best way to show how and where energy is used in the plant. The more detail that is presented in this section, the easier it will be to demonstrate success of the plan.>

Fuel source usage breakdown can be shown in a table such as this:

Fuel, Resource, Productivity	*Total Annual Consumption/Production*	*Total Annual Cost/value*	*Percentage of Total Plant Energy Cost/production units*
Electricity			
Natural Gas			
Fuel Oil			
District Steam			
Other fuel			
Water			

<It is best to slice the energy pie for each fuel source in as many ways as possible that are meaningful to you in order to identify the best approach to improving energy intensity. Two example tables are shown below to illustrate different ways to show the breakdown of electrical energy consumption. Other energy disaggregation methods may be more applicable to your specific situation.>

<It is important to identify the uncertainty associated with this activity and link back to energy information references listed in the Background section above.>

<It may be necessary to construct a table that shows the annual energy use profile by month if the plant operations vary greatly over the course of a year.>

One way of showing electrical energy use breakdown by system type:

Types of End-Uses	*Gas Usage (therms/yr)*	*Energy Usage (kWh/yr)*	*Operating Peak kW*	*% of Total*	*Uncertainty +/-%*	*Source of Energy Information*
Fans						
Pumps						
Space Heating						
Space Cooling						
Lighting						
Plug Loads						
Process Equipment						
Other						
Total:						

IDENTIFIED CONSERVATION CAPITAL PROJECTS:

<Create a table of known opportunities for energy savings projects involving capital investment. List the systems with identified savings along with their energy consumption, potential for savings, and next steps to achieving the savings. State the source of information for energy savings potential. Use a separate table for each energy source.>

Electricity Savings Capital Projects:

System Name	*Annual Energy Consumption*	*Operating Peak MW*	*Conservation Measure*	*Estimated Savings*	*Estimated Operating Peak MW Reduction*	*Source of Information*	*Date of Information*
Boilers	*40,000 kBtu*		*New Burner*	*5,000 kBtu*		*Consultant Study*	*Month, Year*
Exhaust Fans	*13,000 kBtu*		*Add timers .*	*2,000 kBtu*		*Internal Study*	*Month, Year*
Hot Water Pumps	*15,000 kBtu*		*Install VFDs*	*3,000 kBtu*		*Rough Estimate*	*Month, Year*

<List all known opportunities in the table above even if they are presently considered to be uneconomical or otherwise not currently feasible.>

OPERATIONAL SAVINGS AND EMPLOYEE AWARENESS PLAN:

<Opportunities to improve energy intensity and competitiveness through operational and employee awareness programs should not be overlooked.>

<Operational savings are typically achieved through non-capital improvements to control systems. Optimizing the operation of a system from an energy perspective can often produce significant and measurable savings while maintaining or improving the system reliability and throughput.>

<Employee awareness programs identify and target everyday actions that employees can be encouraged to do, with the intent that the actions become second nature for the savings to persist well past the initial push for awareness. This type of activity dovetails well with operational savings. System operators often have ideas for optimizing their system and eliminating wasteful idling or other unnecessary run time but need the environment to encourage the development of these opportunities.>

<Investigate and document opportunities here for operational and employee awareness savings.>

ENERGY CONSERVATION TARGETS:

<Using the potential energy savings identified for each fuel source in the previous sections, set annual conservation targets for five years. Include stretch targets in high/medium/low scenarios for estimated savings>.

ELECTRICITY SAVINGS TARGETS:

Year	*Savings High (kWh)*	*Savings Medium (kWh)*	*Savings Low (kWh)*
1			
2			
3			
4			
5			

GAS SAVINGS TARGETS:

Year	*Savings High (therms)*	*Savings Medium (therms)*	*Savings Low (therms)*
1			
2			
3			
4			
5			

<Schedule time annually to update this plan and extend the conservation target for another year. This will produce a rolling 5-year target that when compared to results achieved, should continue to justify investment in conservation for years to come.>

ACTION PLAN:

<Turn the targets in the previous section into actionable tasks by tabulating projects, timelines, and accountabilities. The attached spreadsheet can be used as an action plan template for prioritization, tracking, and reporting.>

<Identify any barriers to the implementation of each capital project and think about what strategies could eliminate the barriers. Provide an assessment of the ease of implementing each identified project.>

<In addition to identified capital projects, list the approach and strategies to identify further conservation opportunities that may exist including those relating to:

behavioral; organizational; maintenance; and other.>

<Resolve to bring the energy project team together on a regular basis to systematically work through approval and implementation of the action plan.>

OPPORTUNITY IDENTIFICATION & ANALYSIS:

<Potential projects identified by the Energy Manager/Key Account Manager in conducting a general energy assessment of a property. >

Project Economics, Benefits & Risks for Identified Projects:

Conservation Measure	Feasibility Study Complete?	Estimated Energy Savings (KBtu)	Estimated Operating Peak MW reduction	Estimated Cost ($)	Available Incentives ($)	Project Payback (years)	Productivity, quality, or yield savings	Ease of implementation (easy, medium, hard)	Risk
Pump VFDs	Yes	5,000 KBtu		1,000,000	625,000	1			
Exhaust Fan Timers	Yes	2,000 KBtu		800,000	460,000	2.3			
New Boilers	No	10,000 KBtu		5,000,000	2,300,000	3.6			
Total:	N/A	17.00 MBtu		6.80 M	3.385 M	2.0			

IMPLEMENTATION BUDGET

<This budget should include the cost of the Energy Manager, running the Energy Management team, projects, employee awareness and outreach activities, etc.

APPENDIX I: Sample Energy Conservation Project Tracking Log

Energy Conservation Projects Tracking								
Project Description	*Fuel Type*	*Project Stage*	*Energy Savings*	*Cost Savings*	*Responsible Party*	*% Complete*	*Est. Completion Date*	*Comments (progress & barriers)*

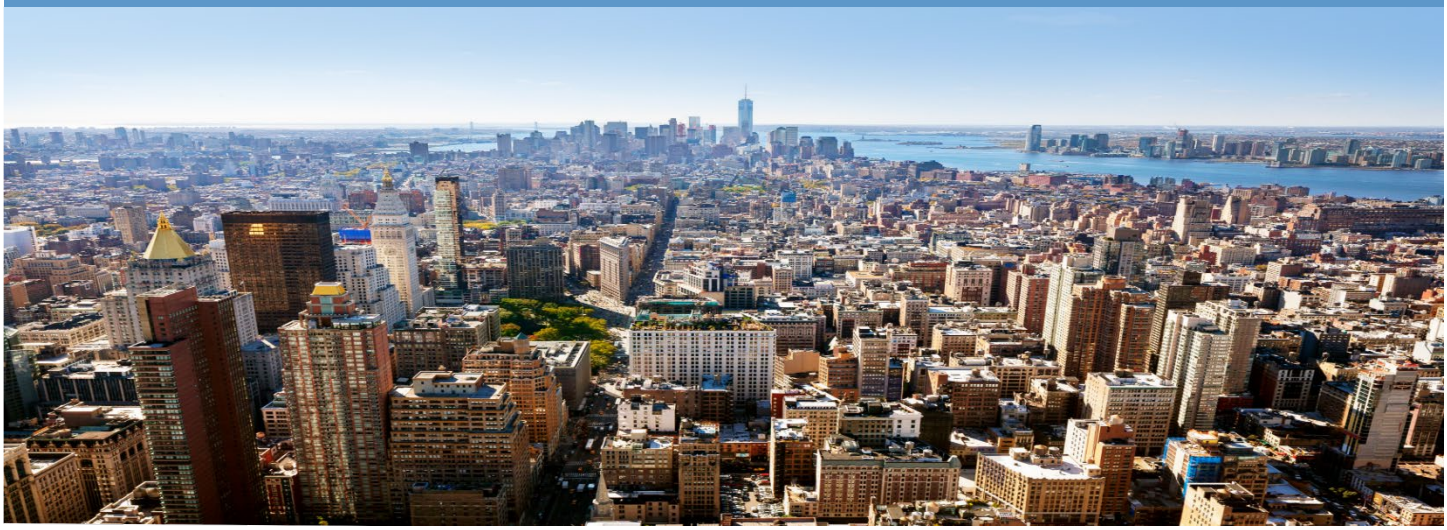
APPENDIX J: ESRT Demand Response Enrollments

FACILITY	ACCOUNT #	NYISO ZONE	NYISO SCR kW	ConEd Window	ConEd CSRP kW	ConEd DLRP kW
10 Bank Street	590004510000019	Zone I (Westchester)	250	2PM-6PM	200	200
112 West 34th Street	494103512700001	Zone J (New York City)	400	2PM-6PM	350	350
1333 Broadway	494112408600001	Zone J (New York City)	150	2PM-6PM	100	100
1350 Broadway	494112408700009	Zone J (New York City)	300	2PM-6PM	250	250
1359 Broadway (Marlboro Building)	494113702100011, 494121230000009	Zone J (New York City)	100	2PM-6PM	100	100
1400 Broadway	494111006100000	Zone J (New York City)	300	2PM-6PM	200	200
250 West 57th Street (Fisk Bldg)	494161309300005	Zone J (New York City)	250	2PM-6PM	200	200
350 Fifth Avenue (Empire State Building)	494202320000008	Zone J (New York City)	1,800	2PM-6PM	1,600	1,600
500 Mamaroneck Avenue	590013435500011	Zone I (Westchester)	200	2PM-6PM	150	150
501 7th Avenue	494113710600002	Zone J (New York City)	250	2PM-6PM	200	200
60 East 42nd Street (One GCP)	494202304300002	Zone I (Westchester)	300	11AM-3PM	250	250

APPENDIX K: Demand Response Brochure

NOTICE OF

EMERGENCY GRID EVENT



[DAY], XX/XX/2019

FROM X:00 PM TO X:00 PM

The grid is expected to reach very high levels of electrical load today.

As part of our ongoing commitment to sustainability, we have partnered with ConEdison and the New York Independent Systems Operator to be a part of an energy saving and grid reliability program called Demand Response. Please take part in supporting this effort by temporarily reducing your electricity use as much as possible DURING the hours listed above.

On our part, we will take measures to temporarily curtail our electricity consumption.

During this time, you may notice reduced lighting and slightly increased temperatures in hallways and common areas, as well as some elevators, and non- essential loads turned off.

DO YOUR PART BY DOING THE FOLLOWING:

Unplug all high power & non-essential loads

Raise temperature setpoints in your area

Shut off all non-essential & task lighting

Switch laptops to battery power

Please keep a balanced, common-sense approach in mind. You know best how to effectively curtail energy with minimal impact on productivity, health, safety or comfort. Involvement is voluntary, but every action -- even small reductions -- contributes to the overall success of this community effort!

THANK YOU FOR YOUR SUSTAINABILITY EFFORTS TO SUPPORT GRID RELIABILITY.

APPENDIX L: Tenant Demand Response Notification E-Mail Template

Notice of Emergency Grid Event

[DAY], XX/XX/2019 from X:00 PM to X:00 PM

As part of our ongoing sustainability efforts and green initiatives, we at Empire State Realty Trust have partnered with ConEdison and the New York Independent Systems Operator (NYISO) to be a part of an energy saving and grid reliability program called demand response.

The grid is expected to reach very high levels of electrical load today and we are being requested by our local utility to help ensure system reliability. **Please support this effort by temporarily reducing your electricity use as much as possible DURING the hours listed above.**

On our part, we will take measures to temporarily curtail our electricity consumption. During this time, you may notice reduced lighting and slightly increased temperatures in hallways and common areas, as well as some elevators, and non-essential loads turned off.

On your part, here are some suggestions to curtail individual electricityuse:

- Turn up thermostats to 75 degrees at the time indicated. Note: Ramping up/down suddenly may actually cause the A/C unit to draw more power.
- Switch off as many lights in the office and break rooms as reasonably possible.

- Switch off extra printers, copiers, monitors, coffee machines, microwaves, toasters, instant hot water dispensers, water coolers, fans, heaters, unused computers, video displays, vending machines and other non-essential loads (or use battery power for laptops)

Please keep a balanced, common-sense approach in mind. You know best how to effectively curtail energy with minimal impact on productivity, health, safety or comfort. **Involvement is voluntary, but every action -- *even small reductions* -- contributes to the overall success of this community effort!**

Thank you for your sustainability efforts to support grid reliability.

APPENDIX L: Tenant Demand Response Email Notification Sample

Notice of Emergency Grid Event

[Friday] **[07/19/2019], from [2:00 PM] to [6:00 PM]**

During Curtailment, Energy Saved is Equivalent to…

796 trees planted

36 homes' monthly energy use

73,880 miles driven by an average car

3,492 gallons of gasoline

The grid is expected to reach very high levels of electrical load today and we are being requested by our local utility to help ensure system reliability. **Please support this effort by temporarily reducing your electricity use as much as possible DURING the hours listed above.**

On our part, we will take measures to temporarily curtail our electricity consumption. During this time, you may notice reduced lighting and increased temperatures in spaces, hallways, and common areas, as well as some elevators, fountains and non-essential loads turned off. Where we control temperature settings we will Turn up settings by two degrees. Please note that following the event, it may take some time for temperatures to return to condition experienced prior to the event.

On your part, here are some suggestions to curtail individual electricity use:

- Tenant controlled A/C units, Turn up thermostats two degrees at the time indicated and every half-hour thereafter Note: Ramping up/down suddenly may actually cause the A/C unit to draw more power.
- Switch off as many lights in the office and break rooms as reasonably possible.
- Switch off extra printers, copiers, monitors, coffee machines, microwaves, toasters, instant hot water dispensers, water coolers, fans, heaters, unused computers, video displays, vending machines and other non-essential loads (or use battery power for laptops)

Please keep a balanced, common-sense approach in mind. You know best how to effectively curtail energy with minimal impact on productivity, health, safety or comfort. **Involvement is voluntary, but every action -- *even small reductions* -- contributes to the overall success of this community effort! Thank you for your sustainability efforts to support grid reliability.**

EMPIRE STATE REALTY TRUST

conEdison

How You Can Contribute

Unplug all high power and non-essential loads

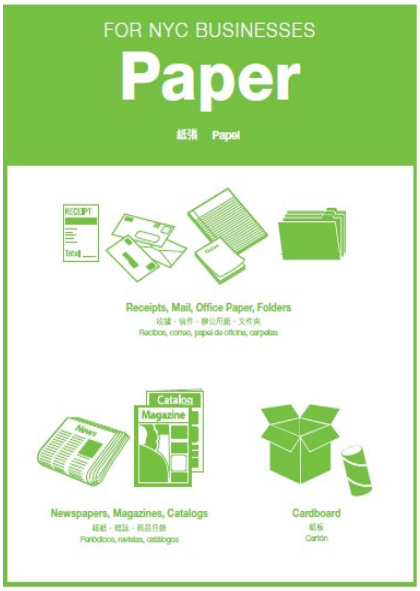
Raise temperature setpoints in your surrounding space

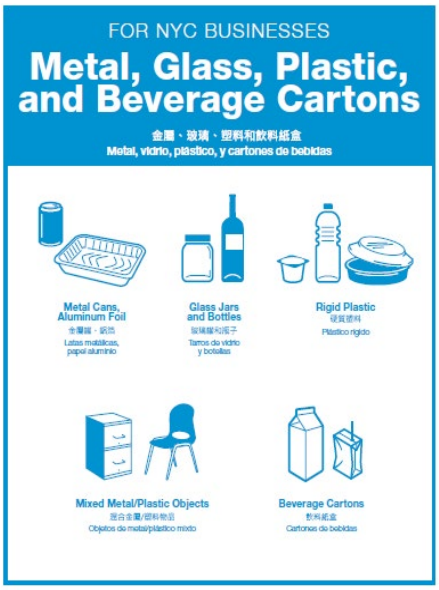
Shut off all non-essential and task lighting

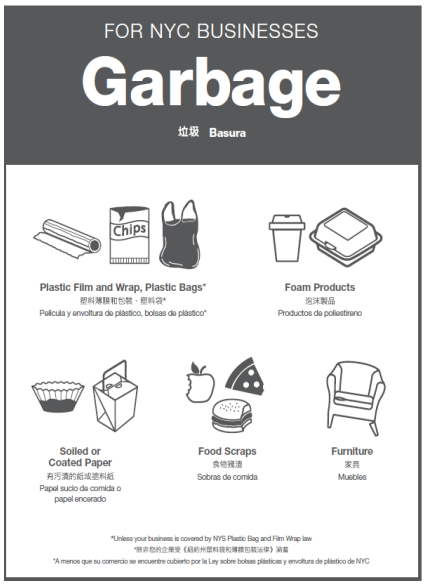
Switch laptops to battery power

APPENDIX M: Waste & Recycling Signage

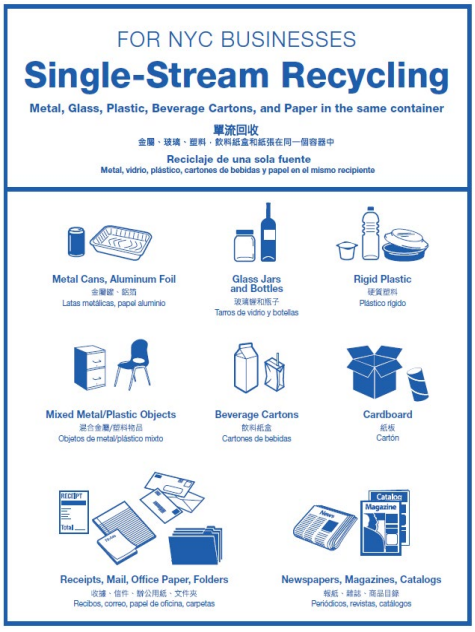
Source Separated Signage:

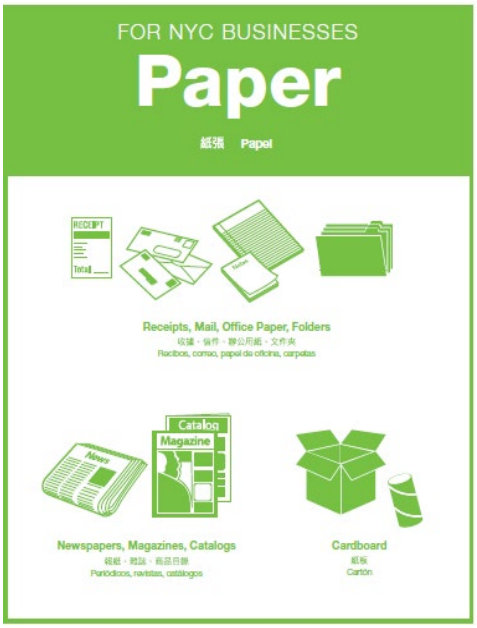






Single Stream Signage:





APPENDIX N: Waste Walkthrough Checklist

Walkthrough Checklist

Materials for Walkthrough

- ✓ Clipboard
- ✓ Pen
- ✓ Checklist
- ✓ Office Floor Plan (if available)
- ✓ Waste & Recycling Policy for Building/Office (if available)

1. Is there evidence of an established recycling program? (i.e. recycling bins, signage, recycling collection area in loading dock, etc.)
   - ☐ Yes
   - ☐ No
   - ☐ If yes, are there bins for recycling collection?
   - ☐ If no, is there a reason why there is no recycling program?

2. Is there a waste decal(s) visible from the street?
   - ☐ Yes
   - ☐ No

3. Which of the following information is present on the waste decal(s)?
   - ☐ Name of carter
   - ☐ Days/Times of pickup
   - ☐ Carting methodology
   - ☐ Spaces served

4. Who is the waste and recycling hauler for the building? (If there are separate haulers for waste and recycling, please designate).
   - Waste Hauler: _____
   - Recycling Hauler (if different from waste hauler): _____
   - Electronic Waste Hauler: _____
   - Organics Hauler (if applicable):_____
   - Hazardous Waste Hauler (if applicable) :_____

Back-of-the Building Spaces

5. Is the collection methodology evident in the building, such as source separated or single stream?
   - ☐ Yes
   - ☐ No
   - Notes: _____

6. What is the collection methodology?
   - ☐ Source Separated: three bins- one for paper, one for plastic/metal/glass, and one for landfill
   - ☐ Single Stream: two bins - one bin for landfill and one for paper, plastic, metal, and glass.

- ☐ Other:_____

7. Where are recyclables stored prior to waste collection for the haulers?
   - ☐ Loading Dock
   - ☐ Other:_____

8. Are separate containers provided for trash and recyclable materials in the loading dock or other common waste collection location?
   - ☐ Yes (trash and recycling containers provided, compost if applicable)
   - ☐ No (only trash containers provided)
   - Notes:_____

9. Are there bin labels and signage designating the waste stream? Bin labels refers to label affixed directly on the bin to indicate the intended waste stream, and signage refers to educational information to indicate the types of materials that should go in each bin.

   - ☐ Yes, there are bins + signage
   - ☐ Yes, there are bins labels only
   - ☐ No bin labels or signage
   - Notes:_____

Tenant Spaces

10. Are there separate bins for waste and recycling (one for paper, one for plastic/metal/glass, one for trash for source separated - or one recycling bin for single stream including paper, plastic/metal/glass, and one trash for single stream)?
    - ☐ Yes (trash and recycling bins containers provided)
    - ☐ No (only trash containers provided)
    - Notes:_____

11. Does the bin setup align with the waste stream as designated by the building? (Ex: are there single stream bins, but the building has source-separated recycling collection?).
    - ☐ Yes
    - ☐ No
    - Notes:_____

12. Are there bin labels on each of the bins to designate the appropriate waste stream?
    - ☐ Yes
    - ☐ No
    - Notes:_____

13. Are bins color coded? If yes, indicate the colors for each waste stream. Also indicate if the bin color coding is consistent throughout the space.
    - ☐ Yes
    - ☐ No
    - Colors:_____
    - Consistent:_____

14. Is there educational signage located above the bins to inform employees of the appropriate materials to put in the trash and recycling bins?

- ☐ Yes
- ☐ No
- Notes:_____

15. Through visual observations, does it appear that the contents of the bins contain only the items that are supposed to be in them (i.e. landfill waste is only in the landfill waste bin, plastics are only in the p/m/g bin, etc.)?
    - ☐ Yes
    - ☐ No
    - Notes:_____

16. Is there a recycling bin located next to every trash bin?
    - ☐ Yes
    - ☐ No
    - Notes:_____

17. Is there a location to collect electronic waste?
    - ☐ Yes
    - ☐ No
    - Notes:_____

18. Are bins strategically located (are there paper bins located in the copy room, trash and recycling in the kitchen/pantry area)?
    - ☐ Yes
    - ☐ No
    - If no, where should additional bins be placed? _____
    - Notes: _____

19. Are the bins overflowing? This may indicate that there are not enough trash and recycling bins throughout the office.
    - ☐ Yes
    - ☐ No
    - ☐ Notes: _____

20. Are there any bins that are empty? This may indicate that there are too many or unnecessary bins in the office.
    - ☐ Yes
    - ☐ No
    - ☐ Notes: _____

21. Does every copy and mail room have a paper bin?
    - ☐ Yes
    - ☐ No
    - ☐ Notes: _____

22. Does every pantry have at a minimum a landfill waste and plastic/metal/glass bins?
    - ☐ Yes
    - ☐ No
    - ☐ Notes: _____

23. Is there compost collection?
    - ☐ Yes
    - ☐ No
    - ☐ Notes: _____

APPENDIX O: Waste & Recycling Tracking Log

Waste Pick-Up Date	Waste Material	Removal Method	Hauler	Unit	Weight
1/1/2019	Cardboard	Recycled	ABC	Tons	1.2
1/1/2019	Trash	Landfilled	ABC	Tons	1

A. Total Waste Collected (Weight)

B. Total Waste Diverted (Weight):

C. Diversion Rate % (B/A):

APPENDIX P: NYC Waste & Recycling Collection Methodologies

Source-Separated

Single Stream

Appendix Q: Sustainable Procurement Ongoing Consumables Tracking Log

Date of Purchase	Purchasing Party	Vendor	Product Name & Manufacturer	Quantity	Cost per Unit ($)	Sustainability Criteria (from dropdown list)
1/1/2019	ABC Building	ABC Paper	Paper: 11x17 24lb LYNC	8000	$1,456	None
1/1/2019	ABC Building	ABC Paper	18x12 66.46M (80) Brilliant White Smooth Finish MOHAWK NAVAJO COVER DIGITAL 10-765	24500	$2,719.50	Post-Consumer Recycled Content Levels Exceed EPA Comprehensive Procurement Guidelines

Reference: Sustainability Criteria
Post-consumer Recycled Content levels exceed EPA Comprehensive Procurement Guidelines
Rechargeable Batteries
Remanufactured Toner Cartridges
Bio-based Products meet the Sustainable Agriculture Network's Sustainable Agriculture Standard
FSC Certified paper/wood products
Other