“Green Initiative”
&
Sustainability Report

for

City of Novi

Public Safety Building
&
Fire Stations

June 9, 2026

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EXECUTIVE SUMMARY: SUSTAINABILITY & RESILIENCY

The City of Novi Public Safety Facilities Program is founded on the principle that sustainability and resiliency are inseparable from operational excellence. As essential public safety infrastructure designed to serve the community for the next fifty years and beyond, these facilities are to provide long-term value through durability, energy efficiency, adaptability, occupant wellness, and responsible stewardship of public resources.

The sustainability strategy for the Public Safety Campus and Fire Stations is guided by a practical, performance-based approach that prioritizes lifecycle value over short-term gains. Rather than pursuing sustainability as a checklist of individual features, the project integrates environmental responsibility, operational resiliency, and fiscal stewardship into the fundamental planning, design, construction, and operation of each facility.

The design emphasizes passive building strategies as the first and most enduring means of reducing energy consumption and operational costs. Building orientation, while limited, along with enhanced thermal envelopes, high-performance glazing systems, daylight harvesting, solar control, and durable low-maintenance materials work together to reduce energy demand while improving occupant comfort and long-term building performance.

Mechanical and electrical systems are being evaluated through a lifecycle cost framework that balances initial cost, energy performance, reliability, maintainability, and future adaptability. The preferred design approach incorporates Dedicated Outdoor Air Systems (DOAS), high-efficiency zone-based heating and cooling systems, energy recovery technologies, advanced building controls, LED lighting, daylight-responsive controls, and low-flow plumbing fixtures. Geothermal heat pump systems and future renewable energy opportunities have been evaluated as part of the project's commitment to reducing operational energy consumption and carbon emissions, but is a cost driver impacts budget, operational and programmatic needs.

The project also recognizes the critical relationship between occupant wellness and facility performance. Public safety professionals face unique physical and mental demands. Accordingly, the design prioritizes natural daylight, views of nature, enhanced indoor air quality, contaminant control strategies, fitness and wellness amenities, individual environmental controls, and indoor-outdoor connections that support physical health, mental wellbeing, recruitment, retention, and overall organizational resilience.

Site design strategies seek to preserve and enhance the ecological character of each property while responsibly managing stormwater and protecting natural resources. Native and adaptive plantings, such as "low-to-no" maintenance drought tolerant xeriscaping requiring minimal irrigation, preservation of existing woodlands where feasible, low-impact development practices, bioretention opportunities, and stormwater management systems are incorporated to reduce environmental impacts and improve long-term site performance.

Material selection is guided by durability, maintainability, embodied carbon reduction, and lifecycle value. The project prioritizes long-lasting materials that can withstand intensive public safety operations while minimizing replacement cycles and maintenance costs. Opportunities for low-carbon concrete, recycled-content materials, responsibly sourced products, and mass timber applications in select public spaces will be evaluated throughout design development.

Resiliency remains a central sustainability objective. As Risk Category IV essential facilities, these buildings must continue to operate during severe weather events, utility disruptions, and emergency situations. Enhanced building envelopes, hardened emergency operations spaces, backup power systems, redundant infrastructure, and future-ready building systems contribute to a comprehensive resiliency strategy that supports uninterrupted public safety operations under a wide range of conditions.

Collectively, these initiatives support the City's commitment to creating facilities that are environmentally responsible, operationally resilient, economically sustainable, and supportive of the people who protect and serve the community every day. The resulting facilities will serve as long-term civic assets that demonstrate responsible stewardship of public investment while establishing a new benchmark for sustainable public safety infrastructure in Southeast Michigan.

END of SUMMARY

SUMMARY: GREEN INITATIVE

Based on the revised/updated Concept Design Report [CDR] dated May 4, 2026 issued at 35% progress design, the project identifies several sustainability approaches, including DOAS + Water Source VRF, daylighting, low-flow fixtures, native landscaping, stormwater management, geothermal evaluation, low-VOC materials, and durable construction.

For a 50+ year Public Safety facility, see the following sustainability strategies separated into four categories:

1. PASSIVE DESIGN STRATEGIES
These provide the highest ROI because they reduce energy demand before any equipment is added.

Building Orientation & Solar Control

Solution

- Orient occupied spaces north/south where possible
- Minimize east/west glazing
- Exterior sunshades
- Deep window recesses
- Light shelves / "eyebrow" canopies

Pros

✓ No maintenance
✓ 50+ year life expectancy
✓ Reduces cooling loads
✓ Improves occupant comfort
✓ Improves daylight harvesting

Cons

✕ Must be incorporated early
✕ Site constraints may limit effectiveness

Alternative

Dynamic façade studies during early design phases to optimize glazing percentages by elevation.

Enhanced Building Envelope

Solution

- Continuous exterior insulation
- Triple-pane glazing
- Thermally broken framing
- Air barrier commissioning
- Reduced thermal bridging

Pros

✓ No moving parts
✓ Reduces heating and cooling loads

✓ Improves resiliency
✓ 50+ year lifespan

Cons
✕ Higher first cost

Alternative
Passive House-level envelope on administration and dormitory portions while keeping apparatus bays more conventional.

Daylighting

Solution
- Clerestories
- Light shelves
- Dormitory daylight access
- Office daylight access

Pros
✓ No maintenance
✓ Wellness benefits
✓ Reduced lighting loads

Cons
✕ Potential glare

Alternative
Electrochromic glazing in high-value spaces. This option may be cost prohibitive.

Thermal Mass

Solution
- Exposed concrete floors
- CMU
- Concrete shear walls

Pros
✓ No maintenance
✓ Stabilizes temperature swings
✓ Long life

Cons
✕ Limited impact if HVAC controls aren't optimized

2. HIGH-PERFORMANCE MECHANICAL SYSTEMS

For Novi's climate, mechanical systems are likely the largest sustainability opportunity.

The report currently identifies:

- DOAS + Water Source VRF
- Geothermal (alternate) - This option may be cost prohibitive.
- VAV RTU (alternate)

Option A: DOAS + Water Source VRF

Pros

✓ Good zone control

✓ Excellent dormitory control

✓ Good energy performance

✓ Scalable

Cons

✕ Refrigerant management

✕ Moderate maintenance

✕ Complex controls

Recommendation

Good baseline system.

Option B: Geothermal + Water Source Heat Pumps

Pros

✓ Lowest operating cost

✓ Longest life-cycle value

✓ Lowest carbon footprint

✓ No cooling towers

✓ Excellent resiliency

✓ Stable Michigan ground temperatures

Cons

✕ Highest first cost

✕ Requires site area

✕ Longer payback

Recommendation

For a 50-year public safety facility, this is the strongest long-term sustainability solution. The report already identifies this as the "Gold Standard." However, this option may be cost prohibitive that the budget will not allow.

Option C: Air Source VRF

Pros

✓ Lower cost than geothermal

✓ High efficiency
✓ Excellent control

Cons
✕ Lower winter efficiency
✕ Outdoor equipment exposure

Recommendation
Good compromise if geothermal is rejected.

3. SITE & LANDSCAPE SUSTAINABILITY

Native Landscaping

Solution

- "Xeriscaping"
- Native Michigan species
- Pollinator habitats
- Reduced turf

Pros
✓ Drought tolerant
✓ Minimal irrigation
✓ Low maintenance
✓ Ecological value

Cons
✕ Different aesthetic than traditional landscape.

Recommendation
Strongly support.
Already identified in the report.

Rain Gardens & Bioswales

Pros
✓ Improves water quality
✓ Reduces stormwater infrastructure
✓ Enhances site ecology

Cons
✕ Some seasonal maintenance

Alternative
Bioretention cells integrated into parking islands.

Tree Canopy Strategy

Pros

✓ Reduced heat island

✓ Reduced cooling loads

✓ Increased site value

Cons

✕ Long establishment period

Recommendation

Attempt to preserve mature trees at each Fire Station project site.

Permeable Pavement

Pros

✓ Reduced runoff

✓ Groundwater recharge

Cons

✕ Not ideal for apparatus routes

Recommendation

Use only for staff parking.

4. MATERIALS & CONSTRUCTION

These are often overlooked but have major carbon impacts.

Mass Timber

The report identifies interest in mass timber.

Pros

✓ Major embodied carbon reduction

✓ Warm aesthetic

✓ Wellness benefits

✓ Excellent for public spaces

Cons

✕ Cost

✕ Limited contractor familiarity

Recommendation

Use in:

- Public lobby
- Community room
- Training spaces

Low Carbon Concrete

Solution

- Fly ash
- Slag
- Carbon cured concrete

Pros

✓ Significant carbon reduction

✓ No operational impact

Cons

✕ Slightly longer curing times

Recommendation

Strongly recommended.

Brick & Masonry

Pros

✓ 75-100 year life

✓ Minimal maintenance

✓ Durable

Cons

✕ Higher embodied carbon

Recommendation

A best lifecycle material option for municipal buildings.

Metal Roofing

Pros

✓ 50-70 year life

✓ Recyclable

✓ Solar-ready

Cons

✕ Higher initial cost

Recommendation

Highly recommended.

TPO / EPDM Roofing

Pros

✓ 25-year lifespan

✓ Energy efficient
✓ Durability
✓ Solar reflecting avoid heat gain to spaces below.

Cons
✕ QA/QC concerns
✕ Limited longevity

Recommendation
Highly recommended.

5. ELECTRICAL & ENERGY SYSTEMS

LED Lighting + Controls

Already proposed.

Recommendation
Continue with:

- Occupancy controls
- Daylight harvesting
- Circadian lighting

Solar PV

Current report mentions solar readiness only.

Pros
✓ Reduces utility costs
✓ Public sustainability statement

Cons
✕ Maintenance
✕ Roof coordination

Recommendation
At minimum:

- Design roof structure for future PV
- Conduit pathways
- Electrical capacity

Battery Storage

Pros
✓ Resilience
✓ Demand reduction
✓ Emergency support

Cons
✕ Cost

Recommendation
Evaluate with dispatch/EOC operations.

6. BEST "NO-MAINTENANCE" SUSTAINABILITY ITEMS

The following allows the project to maximum durability and minimum maintenance:

1. Enhanced building envelope
2. High-performance glazing
3. Continuous insulation
4. Thermal mass
5. Building orientation
6. Native landscaping
7. Durable masonry
8. Metal roofing
9. Daylighting
10. Low-carbon concrete

These provide sustainability benefits with virtually no operational burden.

7. MY PRIORITIZED RECOMMENDATION FOR NOVI

For a Risk Category IV public safety facility with a 50-year service life, I would prioritize:

Tier 1 (Must Have)

- Enhanced envelope
- Daylighting
- Native landscape
- DOAS
- High-performance controls
- Low-flow fixtures
- Metal roof
- Solar-ready infrastructure

Tier 2 (Strongly Recommended)

- Geothermal
- Low-carbon concrete
- Mass timber public spaces
- Rain gardens and bioretention
- Battery-ready infrastructure

Tier 3 (If Budget Allows)

- Photovoltaics
- Battery storage

- Electrochromic glass
- Greywater reuse
- Net-zero operational energy study

For these facilities, the single biggest lifecycle improvement would be moving from DOAS + Water Source VRF with cooling tower to DOAS + Geothermal Water Source Heat Pumps, combined with an enhanced envelope package. That combination will likely outperform almost every other sustainability investment over the next 50 years while supporting resilience, occupant wellness, and operational continuity. However, the initial costs are much higher than the budget may allow.

END OF SUMMARY

SUSTAINABILITY APPROACH SUMMARY

The project's sustainability strategy is framed around "common sense sustainability," emphasizing long-term resilience, operational efficiency, occupant wellness, environmental stewardship, and lifecycle value rather than pursuing formal certification such as LEED.

1. Overall Sustainability Vision

The sustainability framework was developed during a Design Excellence Workshop using the AIA Framework for Design Excellence.

The project goals focus on creating facilities that are:

- Resilient and future-ready
- Energy efficient
- Healthy for occupants
- Environmentally integrated
- Operationally durable
- Cost-effective over the building lifecycle

The City specifically prioritizes:

- Long-term operational value
- Reduced environmental impact
- Staff wellness
- Community integration
- Carbon-conscious mechanical systems
- Adaptability over a 50-year building lifespan

2. Energy & Mechanical Sustainability Strategy

High-Efficiency HVAC Systems

The preferred base mechanical strategy uses:

- Dedicated Outside Air Systems (DOAS)
- Water Source VRF (Variable Refrigerant Flow) systems
- Energy recovery ventilation (ERV)
- Zoned controls for occupant comfort and efficiency

Key sustainability benefits include:

- Reduced energy consumption
- Simultaneous heating/cooling efficiencies
- Smaller ductwork requirements
- Improved indoor air quality
- Individual room temperature control
- Lower lifecycle operational costs

The systems are intended to exceed baseline energy code performance by 20–30%.

Geothermal Evaluation
The project is evaluating geothermal heat pump systems as a high-performance alternate. Benefits identified include:

- Reduced fossil fuel dependence
- Elimination/reduction of gas-fired boilers
- Lower cooling tower water use
- Improved winter efficiency using stable ground temperatures
- Enhanced decarbonization potential

The report identifies geothermal WSHP systems as the "Gold Standard" sustainability option.

3. Building Energy Efficiency Measures
The project includes multiple building-wide energy conservation measures:

Lighting & Controls

- LED lighting throughout
- Daylight harvesting systems
- Occupancy-based lighting controls
- Circadian-supportive lighting strategies
- Advanced dimming systems
- Warm nighttime lighting to reduce circadian disruption

Building Envelope & Orientation
The design team identified:

- Solar orientation optimization
- Natural daylighting
- Views to nature
- Reduced heat gain/loss strategies

Operational Controls

- Individual HVAC zoning
- Operable window monitoring tied to energy code compliance
- Demand management strategies
- High-efficiency equipment selection based on lifecycle cost analysis

4. Water Conservation & Stormwater Management

Water Efficiency
The plumbing systems emphasize reduced water consumption through:

- Low-flow plumbing fixtures
- Touchless lavatory faucets
- Reduced GPM shower systems

- Water-efficient fixtures throughout the facilities

The project also considers:

- Greywater reclamation opportunities
- Water conservation strategies for high-occupancy fire station use

Stormwater & Low Impact Development

Stormwater design emphasizes:

- Low impact development principles
- Underground detention systems
- Rain gardens and bioswales where feasible
- Bioretention strategies at FS-03
- Water quality treatment systems
- Integration with Bishop Creek and wetlands

Stormwater systems are designed for:

- 100-year storm events
- Environmental contamination mitigation
- Controlled runoff discharge
- Reduced downstream impacts

5. Environmental Site Integration

The project strongly emphasizes integration with existing natural systems.

Wetlands & Woodland Preservation

The design intentionally:

- Preserves woodland buffers
- Protects wetlands where possible
- Maintains greenbelt easements
- Minimizes ecological disruption
- Incorporates native landscaping strategies

Native Planting & Ecology

Landscape goals include:

- Native plant species
- Habitat-supportive landscaping
- Stream restoration integration
- Erosion reduction
- Tree preservation and replacement
- Reduced irrigation demand

The PSB site specifically integrates:

- A daylighted stream corridor

- Ecological restoration opportunities
- Nature-focused site experiences

6. Health, Wellness & Indoor Environmental Quality

A major sustainability focus is occupant health and wellness.

Indoor Air Quality

The facilities include:

- Dedicated outside air systems
- Increased ventilation rates
- MERV-13+ filtration goals
- Negative pressure contaminant zones
- Apparatus bay air purification systems
- Enhanced exhaust systems in contaminated areas

Firefighter Contamination Control

The fire stations use:

- Hot / Warm / Cold zoning
- Airlocks between apparatus bays and living spaces
- Dedicated decontamination rooms
- Separate contaminated laundry systems
- Exhaust-controlled gear storage areas

Wellness-Oriented Design

The report prioritizes:

- Natural daylight
- Views to nature
- Outdoor decompression areas
- Quiet rooms
- Wellness rooms
- Fitness spaces
- Biophilic design strategies
- Water feature considerations

7. Material & Resource Sustainability

The project includes material sustainability goals such as:

- Low-VOC materials
- Local material sourcing
- Durable long-life materials
- Potential use of reclaimed materials
- Interest in mass timber applications
- Reduced maintenance materials selections

The design also emphasizes:

- Lifecycle durability
- Reduced maintenance burden
- Long-term operational efficiency

8. Resilience & Future Readiness

Sustainability is closely tied to resilience in the project.
Strategies include:

- Full-building generator backup
- Storm-hardened ICC-500 shelters
- Redundant systems
- Flexible infrastructure
- Solar readiness
- EV readiness
- Adaptable building systems
- Future expansion capability

The project explicitly connects sustainability with:

- Emergency continuity
- Climate resilience
- Long-term municipal value
- Reduced operational vulnerability

Key Sustainability Themes

The sustainability approach can be summarized into six primary themes:

Theme	**Strategy**
Energy Efficiency	DOAS + VRF systems, LED lighting, energy recovery
Decarbonization	Geothermal evaluation, electrification readiness
Water Stewardship	Low-flow fixtures, stormwater management
Ecological Integration	Wetland preservation, native landscapes
Occupant Wellness	Daylighting, IAQ, contamination control
Long-Term Resilience	Backup power, adaptable infrastructure, lifecycle durability

The result is a public safety campus intended to function as a resilient, healthy, efficient, and future-ready civic infrastructure investment for the City of Novi.

END OF SUMMARY