An Applied Ecology Framework for Data Centers

Biohabitats

September 2026
Biohabitats, Inc.
V1.2

Table of Contents

Why We Need to Think Differently

Artificial intelligence is transforming nearly every aspect of modern life, and the data centers supporting it are becoming an increasingly permanent part of our communities and landscapes.

Although often described as part of "the cloud," every data center is firmly rooted in the physical world. These facilities occupy landscapes, depend upon water and energy, consume large quantities of materials, and influence the ecological and cultural character of the places in which they are built. Their impacts extend well beyond the property boundary, affecting watersheds, biodiversity, infrastructure, climate, and community well-being.

Responsible data center development requires more than operational efficiency. It requires decisions that recognize the interconnected relationships among communities, living systems, infrastructure, and technology. Regulatory tools used and decisions made during local land use planning, site selection, planning, design, construction, operations, and eventual reuse influence landscapes and communities for decades. Because many local government policies are ill-equipped to provide the needed regulatory safeguards for wise planning, this framework should be supplemented with resources and advocacy efforts to facilitate best practices across jurisdictions.

Applied ecology provides the scientific foundation for this framework. By integrating ecological understanding with planning, engineering, architecture, landscape architecture, and other design disciplines, applied ecology helps corporations, developers, and project teams understand the relationships between development and the living systems in which it occurs. It encourages decisions that work with ecological processes rather than simply minimizing impacts.

This framework provides guiding principles, framework themes, evaluation criteria, and guiding questions that support multidisciplinary decision-making throughout the life of a project. Rather than functioning as a rating system or regulatory checklist, it is intended to encourage thoughtful discussion, inform better decisions, and advance responsible data center planning, design, and long-term management.

The framework is organized around four interconnected themes.

Site Selection asks whether a proposed location is appropriate before major investments are made.

Communities explores how data centers can become valued members of the communities in which they are built.

Living Systems examines how projects can protect, conserve, restore, and regenerate the ecological processes that sustain life.

Adaptive Futures encourages long-term thinking by considering how projects learn, adapt, and evolve throughout their life cycle.

Together, these themes encourage a broader understanding of sustainability that recognizes data centers as permanent components of both human and ecological communities.

Guiding Principles

The following principles reflect Biohabitats' approach to planning, designing, and evaluating responsible data center development.

1. Nature First

Nature is not simply the setting for human activity. It is a dynamic community of living systems with its own integrity, agency, and capacity for adaptation. Responsible data center development begins by recognizing that people are participants within these living systems and that every project should seek to protect, conserve, restore, and strengthen the ecological relationships that sustain both human and more-than-human communities.

2. Think in Relationships

Every project influences ecological, social, cultural, and economic relationships. Understanding these connections helps avoid unintended consequences while creating opportunities for multiple, mutually reinforcing benefits.

3. Regenerate Ecological Processes

Responsible projects should strengthen ecological processes over time, not simply reduce impacts. Opportunities to restore hydrologic processes, reconnect fragmented landscapes, rebuild healthy soils, expand habitat, increase biodiversity, and strengthen ecological resilience should be integrated throughout planning, design, construction, and long-term management.

4. Design for Adaptive Futures

Technology evolves rapidly, while the landscapes supporting it often persist for generations. Responsible projects anticipate change by integrating adaptive management, flexibility, future reuse, deconstruction, and material recovery into planning and design. Long-term success depends upon a project's ability to respond to changing technologies, ecological conditions, and community needs.

5. Measure, Learn, and Adapt

Meaningful sustainability requires continuous learning. Projects should establish clear ecological, social, and operational objectives, monitor outcomes over time, and apply what is learned through adaptive management. As new information becomes available, projects should evolve to better support communities and living systems.

6. Collaborate Across Disciplines

Responsible data center development requires perspectives that no single discipline can provide alone. Applied ecologists, biologists, planners, engineers, architects, landscape architects, Tribal Nations, Indigenous knowledge holders, developers, utilities, researchers, local governments, and community members each contribute valuable knowledge. Bringing these perspectives together early leads to more informed, resilient, and enduring decisions.

How to Use This Framework

This framework supports decision-making throughout the planning, design, construction, operation, and long-term evolution of data center projects. It can be used alongside existing regulations, sustainability programs, environmental review processes, and engineering standards, while addressing important ecological and community considerations that are often overlooked or insufficiently evaluated during conventional planning and design.

While this framework is intended to support project-level decision-making, its greatest value is realized when paired with thoughtful comprehensive planning, land use policy, and zoning. Local governments play a critical role in establishing where data centers are appropriate, where additional safeguards are warranted, and where development should be discouraged to protect communities and living systems.

Although the framework can be applied throughout every stage of development, its greatest value lies at the earliest stages of planning. Decisions regarding site selection and early community engagement often have a greater influence on long-term outcomes than any subsequent design decision. Identifying opportunities and constraints before a site is selected can reduce conflict, avoid unnecessary impacts, build trust, and create more resilient projects.

Each section begins with a brief discussion of why each theme is important, followed by framework elements, evaluation criteria, and guiding questions intended to support informed discussion rather than prescribe specific solutions. Some questions can be answered through quantitative analysis, while others rely upon collaboration, professional judgment, local ecological knowledge, and community experience.

Version 1.2 of this framework is intended to evolve. As ecological science, technology, and professional practice continue to evolve, Biohabitats will continue to refine this framework through experience, collaboration, and adaptive management.

Framework Elements

The framework is organized into a series of Framework Elements that represent the principal considerations for responsible planning, design, and long-term management. Together, they encourage project teams to evaluate data centers through the interconnected lenses of landscape, community, ecology, and adaptability. Each Framework Element includes Evaluation Criteria and Guiding Questions intended to support informed decision-making throughout the life of a project.

Site Selection

Determining whether the proposed location is ecologically, socially, and operationally appropriate before significant design and investment decisions are made.

Attributes

→ Landscape context and ecological suitability.

→ Community compatibility.

→ Previously developed and industrial lands.

→ Future adaptability

Communities

Supporting healthy, resilient, and equitable communities through transparent planning, meaningful engagement, and respect for local values, cultural landscapes, and community well-being.

Attributes

→ Community well-being

→ Overburdened and disadvantaged communities

→ Tribal lands and cultural landscapes

→ Transparency and public participation

→ Community benefits

→ Governance and long-term accountability

Living Systems

Protecting, conserving, restoring, and strengthening the ecological processes, biodiversity, water resources, and landscape relationships that sustain life.

Attributes

→ Landscape ecology

→ Nature intelligence

→ Indigenous knowledge

→ Ecological design

→ Biodiversity

→ Water

→ Climate and energy

→ Operational disturbance

Adaptive Futures

Designing, constructing, operating, and ultimately adapting or deconstructing facilities to remain resilient as technologies, communities, and environmental conditions change.

Attributes

→ Materials

→ Construction

→ Operations

→ Adaptive management

→ Future reuse

→ Design for deconstruction

→ Circular economy

→ Landscape restoration

Framework Element #1

Site Selection

Site Selection

The location of a data center often has a greater influence on its long-term ecological, social, and economic impacts than any subsequent design decision.

Data centers should be evaluated within the context of the larger ecological systems in which they are located, including ecoregions, watersheds, habitat networks, and regional conservation priorities.

Some landscapes possess ecological characteristics, conservation significance, or resource limitations that make them fundamentally incompatible with the long-term demands of data center development. Water-intensive facilities may be inappropriate in arid and semi-arid regions where water availability is already constrained. Likewise, projects should avoid locations that compromise the ecological integrity of critical conservation landscapes, fragment regionally important habitat corridors, or place additional pressures on watersheds and ecosystems that support rare, threatened, or endangered species. Understanding these broader ecological relationships helps determine not only whether a site can support a data center, but whether it should.

Before evaluating building performance, operational efficiency, or sustainability measures, project teams should first determine whether the proposed site is appropriate.

Site selection is an iterative process that considers the following attributes together rather than independently:

→ Landscape context and ecological suitability

→ Community compatibility

→ Previously developed and industrial lands

→ Future adaptability

Choosing the right site can avoid unnecessary impacts to communities and living systems, reduce permitting challenges, improve long-term resilience, and create opportunities for more successful projects.

Landscape Context and Ecological Suitability

Evaluation Criteria

- Regional ecological context
- Ecoregional suitability
- Regional conservation priorities
- Watershed compatibility
- Landscape connectivity
- Habitat fragmentation
- Climate resilience
- Climate adaptation corridors
- Cumulative ecological impacts

Guiding Questions

- How does the proposed site fit within the broader landscape and watershed?
- Does the project avoid ecologically significant lands, protected areas, and landscapes identified for long-term conservation?
- Will the project fragment important habitats or diminish landscape connectivity?
- How are wetlands, floodplains, streams, riparian corridors, and other sensitive ecological systems avoided or protected?
- Can water needs be met without degrading aquatic ecosystems, depleting aquifers, or affecting surrounding communities?
- How will projected changes in climate, flooding, drought, wildfire, or sea level influence the long-term suitability of the site?
- Have cumulative ecological impacts beyond the project boundary been evaluated?
- Could another location achieve the project's objectives with fewer impacts to living systems?

Site Selection

Previously Developed and Industrial Lands

Evaluation Criteria

- Brownfields
- Former heavy industrial and manufacturing sites
- Previously disturbed lands
- Existing utility corridors
- Existing substations
- Existing fiber infrastructure
- Adaptive reuse opportunities
- Avoiding conversion of undeveloped land

Guiding Questions

- Has redevelopment of previously disturbed or heavy industrial land been fully evaluated before considering undeveloped sites?
- Can existing buildings, infrastructure, or utility corridors be adapted to accommodate the project?
- Does the proposed location avoid the conversion of forests, farmland, wetlands, and other intact landscapes?
- How does the proposed location make use of existing infrastructure while reducing additional land disturbance?

Future Adaptability

Evaluation Criteria

- Long-term climate suitability
- Capacity for future expansion
- Compatibility with changing technologies
- Adaptive reuse potential
- Design for future deconstruction
- Long-term landscape restoration

Guiding Questions

- Will this location remain appropriate as technology, climate, and community conditions evolve?
- Can future expansion or contraction occur without creating significant additional impacts?
- How has the site's future been considered beyond the initial operational life of the data center?
- Will the site ultimately support adaptive reuse, deconstruction, material recovery, and ecological restoration?

Community Compatibility

Evaluation Criteria

- Compatibility with surrounding land uses
- Overburdened and disadvantaged communities
- Tribal Lands and Cultural Landscapes
- Existing and planned land use
- Public infrastructure capacity
- Transportation access and mobility
- Public health, safety, and quality of life

Guiding Questions

- Is the proposed location compatible with surrounding neighborhoods, businesses, schools, parks, and other community assets?
- Does the project avoid disproportionately affecting overburdened and disadvantaged communities?
- Have Tribal Lands, cultural landscapes, and places of historical or cultural significance been identified and appropriately considered?
- How does the proposed location align with adopted community plans and long-term development & conservation objectives?
- Can existing transportation, utility, and digital infrastructure support the project without creating unacceptable burdens?
- Has meaningful community engagement occurred early enough to influence site selection?

Framework Element #2

Communities

Communities

Every data center becomes part of an existing community. Beyond supporting digital infrastructure, these facilities influence community well-being, environmental quality, local economies, and the character of the places in which they are built. Responsible development recognizes that successful projects are founded on trust, meaningful engagement, and a commitment to creating long-term shared value.

The following community attributes help create projects that are not only accepted but valued by the communities they serve.

→ Community well-being

→ Overburdened and disadvantaged communities

→ Tribal lands and cultural landscapes

→ Transparency and public participation

→ Community benefits

→ Governance and long-term accountability

Strong relationships begin early and continue throughout the life of a project.

Community Well-Being

Evaluation Criteria

- Public health and safety
- Community character and identity
- Quality of life
- Compatibility with surrounding land uses
- Public infrastructure and services
- Transportation and mobility
- Community resilience

Guiding Questions

- How does the project contribute to the long-term well-being of the surrounding community?
- How does the project protect public health, safety, and quality of life during construction and operations?
- How are community character, local identity, and existing land uses reflected in project planning and design?
- Does the project strengthen community resilience toward future environmental, economic, and climate-related challenges?
- Does the construction process take into account community well-being and environmental safeguards?
- What lasting benefits will remain for the community throughout the life of the facility and beyond?

Overburdened and Disadvantaged Communities

Evaluation Criteria

- Existing environmental conditions
- Public health conditions
- Cumulative impacts
- Distribution of benefits and burdens
- Equitable access to information
- Meaningful participation
- Community investment

Guiding Questions

- Does the project avoid disproportionately affecting overburdened and disadvantaged communities?
- How have existing environmental conditions and cumulative impacts informed planning and decision-making?
- Have affected communities been meaningfully engaged throughout planning, design, construction, and operations?
- How will project benefits be shared equitably with surrounding communities?
- How are community concerns incorporated into long-term project commitments?

Communities

Tribal Lands and Cultural Landscapes

Evaluation Criteria

- Tribal consultation
- Tribal Lands
- Cultural Landscapes
- Historic and archaeological resources
- Places of cultural significance
- Protection of cultural values

Guiding Questions

- Have Tribal Nations been engaged early enough to meaningfully influence project decisions?
- How have Tribal Lands, Cultural Landscapes, and places of historical or cultural significance been identified and considered?
- Does the project protect and respect cultural resources throughout planning, construction, and long-term management?
- How are cultural values reflected in long-term management of the site?

Community Benefits

Evaluation Criteria

- Local employment
- Workforce development
- Educational partnerships
- Community infrastructure
- Ecological restoration
- Parks and open space
- Shared community investments

Guiding Questions

- How does the project create lasting benefits for the surrounding community?
- What opportunities exist for local employment, workforce development, education, and training?
- How will project investments improve community infrastructure, ecological restoration, parks, or public spaces?
- How do community benefits extend beyond the construction period?
- How are community priorities reflected in project investments?

Transparency and Public Participation

Evaluation Criteria

- Early stakeholder engagement
- Transparent decision-making
- Accessible and understandable information
- Ongoing communication
- Public reporting
- Responsiveness to community concerns
- Impact mitigation commitments

Guiding Questions

- Has public engagement occurred early enough and authentically to meaningfully influence project decisions?
- Is all project information communicated in a transparent, understandable, and accessible manner?
- How are community comments documented, evaluated, and incorporated into project decisions?
- How will community impacts be addressed throughout the life of the project?
- How will communication continue throughout construction and long-term management?
- Are project commitments and outcomes communicated publicly, documented, monitored, and reported in a timely and transparent manner?

Communities

Governance and Long-term Accountability

Evaluation Criteria

- Monitoring and reporting
- Community engagement
- Adaptive management
- Periodic review
- Long-term commitments
- Transparent governance

Guiding Questions

- How will ecological, community, and operational commitments be monitored and periodically reviewed?
- How will monitoring inform adaptive management and continuous learning?
- How will surrounding communities remain informed and engaged after construction is complete?
- What mechanisms exist to periodically review and strengthen project commitments with community input?
- Who is accountable for maintaining long-term commitments and what assurances does the community have?

Framework Element #3

Living Systems

Living Systems

Every data center exists within a living landscape. These landscapes support biodiversity, regulate the movement and quality of water, moderate climate, cycle nutrients, build healthy soils, and sustain the ecological processes upon which both human and more-than-human communities depend. Responsible data center development begins by understanding how these living systems function and designing projects that protect, conserve, restore, and regenerate ecological processes over time. Attributes that make up the living systems framework includes:

→ Landscape ecology

→ Nature intelligence

→ Indigenous knowledge

→ Ecological design

→ Biodiversity

→ Water

→ Climate and energy

→ Operational disturbance

Applied ecology provides the scientific foundation for this work. By understanding ecological processes across multiple scales—from soils and streams to watersheds and regional landscapes—projects can move beyond minimizing impacts to strengthening the resilience and adaptive capacity of living systems.

Landscape Ecology

Evaluation Criteria

- Regional ecological context
- Landscape connectivity
- Habitat fragmentation
- Watershed processes
- Regional conservation priorities
- Climate adaptation corridors
- Cumulative ecological impacts

Guiding Questions

- How does the project fit within the broader ecological landscape?
- Does the project protect and conserve landscape connectivity for terrestrial and aquatic species?
- How are ecological corridors, migration pathways, and natural landscape patterns maintained or restored?
- How does the project influence watershed processes beyond the project boundary?
- Have cumulative ecological impacts within the surrounding landscape been evaluated?
- How does the project contribute to regional conservation priorities and ecological resilience?

Nature Intelligence

Evaluation Criteria

- Ecomimicry
- Ecological processes
- Systems thinking
- Ecological resilience
- Learning from living systems
- Regenerative outcomes

Guiding Questions

- How does the project learn from the structure, processes, and resilience of living systems?
- Where can ecological processes inform planning, design, construction, and long-term management?
- How can ecomimicry support ecological resilience?
- Where can living systems replace or complement engineered solutions?
- How does the project strengthen reciprocal relationships between built infrastructure and the living landscape?

Living Systems

Indigenous Knowledge

Evaluation Criteria

- Indigenous ecological knowledge
- Long-term observations of place
- Reciprocal relationships
- Collaborative learning
- Respectful engagement

Guiding Questions

- How has Indigenous knowledge informed the understanding of the landscape?
- Are there opportunities to integrate Indigenous perspectives into ecological planning, restoration, and adaptive management?
- How can reciprocal relationships with living systems inform project planning and long-term management?
- How are Indigenous knowledge holders recognized as collaborators in understanding place?

Biodiversity

Evaluation Criteria

- Native plant communities
- Habitat diversity
- Pollinator habitat
- Wildlife habitat
- Wildlife-friendly design
- Invasive species management
- Habitat restoration
- Long-term biodiversity monitoring

Guiding Questions

- How does the project protect, conserve, and enhance biodiversity?
- Are native ecological communities protected, restored, and connected to surrounding landscapes?
- How does the project reduce risks to birds, pollinators, and other wildlife?
- Does the project increase habitat diversity and ecological resilience?
- How will biodiversity be monitored and incorporated into adaptive management?

Ecological Design

Evaluation Criteria

- Development footprint
- Land disturbance footprint
- Healthy soils and soil processes
- Native plant communities
- Nature-based stormwater systems
- Multi-functional landscapes
- Ecological restoration
- Regenerative design
- Microclimate

Guiding Questions

- How does the project minimize disturbance while meeting operational requirements?
- Can buildings, roads, and infrastructure be configured to reduce the overall development footprint?
- How are existing ecological features incorporated into the project rather than replaced?
- How are natural hydrologic processes protected, restored, and integrated into site design?
- How are healthy soils protected and restored?
- How does landscape design improve local microclimate while supporting ecological processes?
- How does the project strengthen ecological processes over time rather than simply reduce impacts?

Living Systems

Water

Evaluation Criteria

- Watershed processes
- Cooling water demand
- Water source hierarchy
- Groundwater withdrawals
- Surface water withdrawals
- Rainwater harvesting
- Wastewater recovery and reuse
- Recycled and reclaimed water
- Groundwater recharge
- Water quality
- Aquatic ecosystems

Guiding Questions

- How does the project protect and restore watershed processes?
- Can cooling technologies reduce overall water demand?
- Can harvested rainwater, reclaimed wastewater, or recycled process water supply all or a substantial portion of cooling water needs?
- Have groundwater withdrawals been demonstrated to avoid adverse effects on aquifers, springs, wetlands, streams, rivers, and groundwater-dependent ecosystems?
- Have surface water withdrawals been demonstrated to maintain environmental flows and protect downstream ecological processes?
- How are seasonal droughts, climate change, and cumulative watershed demands incorporated into long-term water planning?
- How does the project protect and restore groundwater recharge?
- How are the water needs of living systems considered alongside the operational needs of the facility?
- Can the project improve watershed health over time?

Climate and Energy

Evaluation Criteria

- Energy efficiency
- Renewable energy
- Grid resilience
- Waste heat recovery
- Greenhouse gas emissions
- Climate mitigation
- Operational resilience

Guiding Questions

- How does the project reduce operational energy demand?
- How does the project produce energy to meet current and future operational needs without burdening ratepayers and the public?
- How are renewable energy sources incorporated into the project to reduce and ultimately eliminate non-renewable sources?
- How will waste heat be beneficially recovered and used?
- How does the project support a resilient and increasingly renewable electric grid?
- How are future climate conditions incorporated into facility planning and operations?

Operational Disturbance

Evaluation Criteria

- Operational noise
- Night lighting
- Wildlife disturbance
- Equipment siting
- Acoustic mitigation
- Dark sky considerations

Guiding Questions

- How are operational noise and lighting impacts minimized for surrounding communities and wildlife?
- Does equipment layout reduce unnecessary disturbance?
- Does the project incorporate dark sky principles where appropriate?
- Does site security measures disrupt wildlife movement and fragment habitat?
- How will operational disturbances be monitored and reduced over time?

Framework Element #4

Adaptive Features

Adaptive Features

Data centers are designed to support technologies that evolve rapidly, while the landscapes they occupy may persist for generations. Responsible development recognizes that planning does not end with construction. Long-term success depends upon continual learning, adaptive management, and the ability to respond to changing technologies, ecological conditions, community priorities, and climate. The following attributes frame a path toward an adaptive future.

→ Materials

→ Construction

→ Operations

→ Adaptive management

→ Future reuse

→ Design for deconstruction

→ Circular economy

→ Landscape restoration

Considering the full life cycle of a project—from construction and operations to future reuse, deconstruction, and ecological restoration—can reduce waste, extend the usefulness of infrastructure, and leave future generations with greater choices.

Materials

Evaluation Criteria

- Material health
- Red List avoidance or equivalent material health screening
- Responsibly sourced materials
- Low-carbon materials
- Recycled and reused materials
- Material transparency
- Material recovery potential

Guiding Questions

- How do material selections reduce embodied carbon and other ecological impacts?
- Have materials been evaluated to avoid Living Building Challenge Red List chemicals or equivalent material health concerns?
- Are materials responsibly sourced and transparently documented?
- Can reclaimed, recycled, or rapidly renewable materials be incorporated into the project?
- How do material selections improve long-term durability and adaptability?
- Can materials be recovered and reused at the end of the facility's life?

Construction

Evaluation Criteria

- Land disturbance footprint
- Adjacent ecosystems
- Healthy soils and vegetation
- Construction waste
- Air quality
- Erosion and sediment control
- Low-emission construction practices

Guiding Questions

- How are construction activities minimizing disturbance to surrounding communities and living systems?
- How are healthy soils, vegetation, and ecological processes protected during construction?
- How is construction waste reduced, reused, or recycled?
- How are dust, emissions, and air quality impacts minimized during construction?
- Can construction methods reduce greenhouse gas emissions and other ecological impacts?

Adaptive Features

Operations

Evaluation Criteria

- Ecological commitments
- Water management
- Energy management
- Landscape management
- Biodiversity management
- Community relationships

Guiding Questions

- How are ecological commitments maintained throughout operations?
- How are landscapes managed to support healthy ecological processes?
- How are operational practices periodically evaluated through adaptive management?
- How are relationships with surrounding communities maintained throughout the operational life of the facility?

Adaptive Management

Evaluation Criteria

- Clear objectives
- Monitoring program
- Monitoring and evaluation
- Continuous learning
- Responsive decision-making
- Climate adaptation
- Ecological restoration
- Stakeholder engagement

Guiding Questions

- Have clear ecological, community, and operational objectives been established?
- Does the monitoring program measure progress toward those objectives?
- How will monitoring results be evaluated, communicated, and incorporated into future decisions?
- What processes exist to incorporate new scientific knowledge, emerging technologies, and evolving best practices during the life of the project?
- What mechanisms will be established to account for changing ecological conditions, climate, and community priorities in future management decisions?
- How will project commitments periodically reviewed and strengthened over time?

Future Reuse

Evaluation Criteria

- Flexible building design
- Adaptable infrastructure
- Alternative future uses
- Community compatibility
- Long-term land use compatibility

Guiding Questions

- Can buildings and infrastructure be adapted to support future technologies or different uses?
- How does the project avoid creating stranded assets?
- Can future uses continue to provide value to surrounding communities?
- Does planning today expand rather than limit future opportunities?

Adaptive Features

Design for Deconstruction

Evaluation Criteria

- Material recovery
- Building disassembly
- Reuse of structural systems
- Waste minimization
- Future flexibility

Guiding Questions

- Can buildings be disassembled rather than demolished?
- How are valuable materials identified for future recovery and reuse?
- How do design decisions today reduce future waste and support circular material flows?

Circular Economy

Evaluation Criteria

- Material recovery
- Equipment reuse
- Closed-loop material systems
- Waste reduction
- Supply chain circularity

Guiding Questions

- How does the project reduce waste throughout its life cycle?
- Can equipment and materials remain in productive use beyond their initial purpose?
- How does the project contribute to a circular economy rather than a linear one?

Landscape Restoration

Evaluation Criteria

- Ecological restoration
- Healthy soils and soil processes
- Habitat restoration
- Watershed processes
- Landscape connectivity
- Long-term ecological trajectories

Guiding Questions

- If the facility is no longer needed, how can the site be restored to support healthy living systems?
- How can ecological processes be restored and strengthened throughout the life of the project rather than deferred until closure?
- What opportunities exist to restore soils, hydrology, habitats, and landscape connectivity?
- Can the site contribute to broader landscape restoration following decommissioning?

Looking Ahead

Data centers will continue to evolve as technologies, computing demands, and societal needs change, but the landscapes and communities that support them will endure long after today's technologies have been replaced. The decisions made today about where these facilities are located, how they relate to communities, and how they interact with living systems will shape ecological and social outcomes for generations.

This framework encourages project teams to ask better questions before decisions become irreversible. By grounding planning, design, construction, operations, and long-term adaptation in applied ecology and informed by Nature Intelligence, data centers can be planned and design to better coexist with the landscapes and communities in which they are located in.

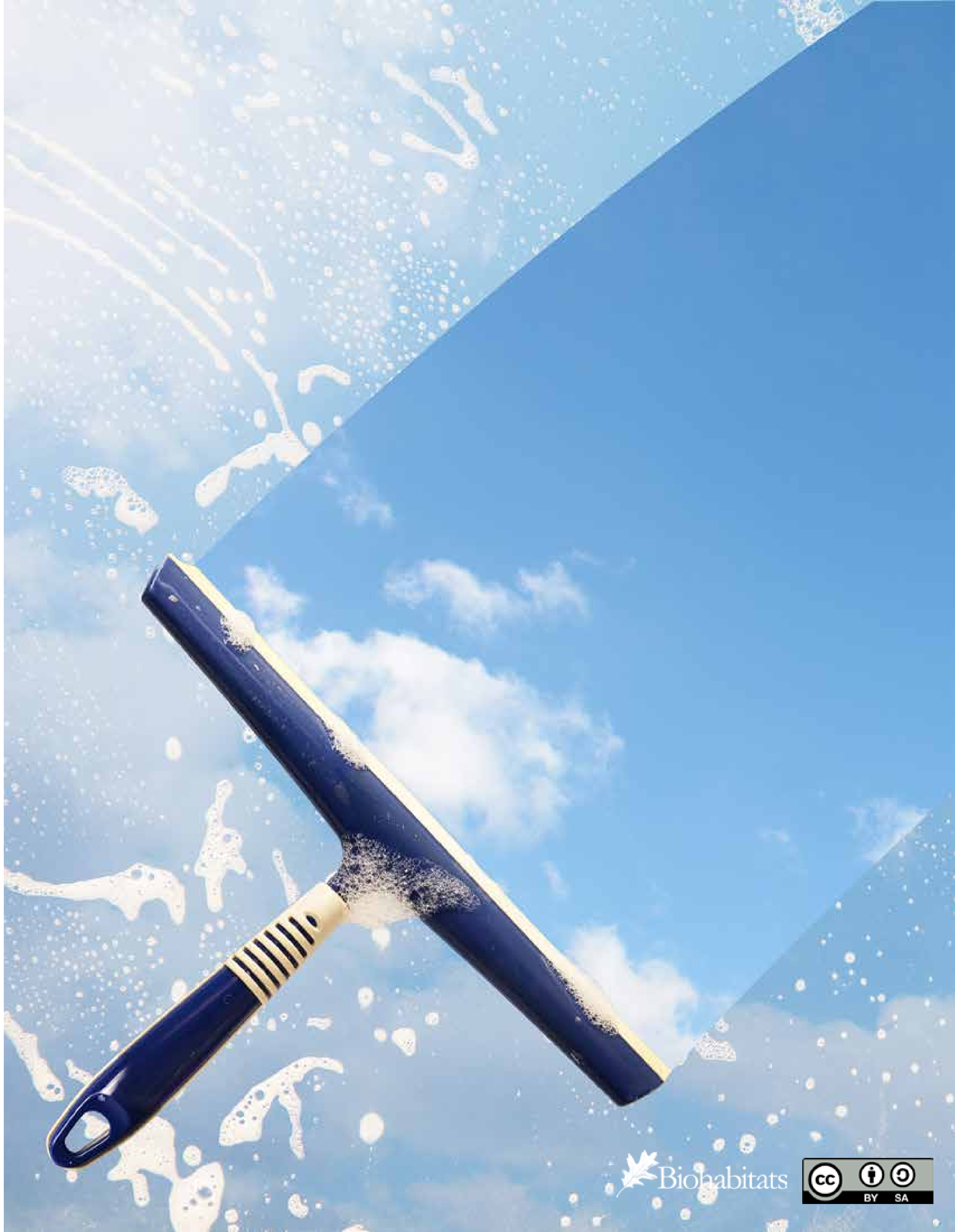
Version 1.2 of this framework is intended to evolve. As ecological science, technology, and professional practice continue to evolve, Biohabitats will continue to refine this framework through experience, collaboration, and adaptive management.

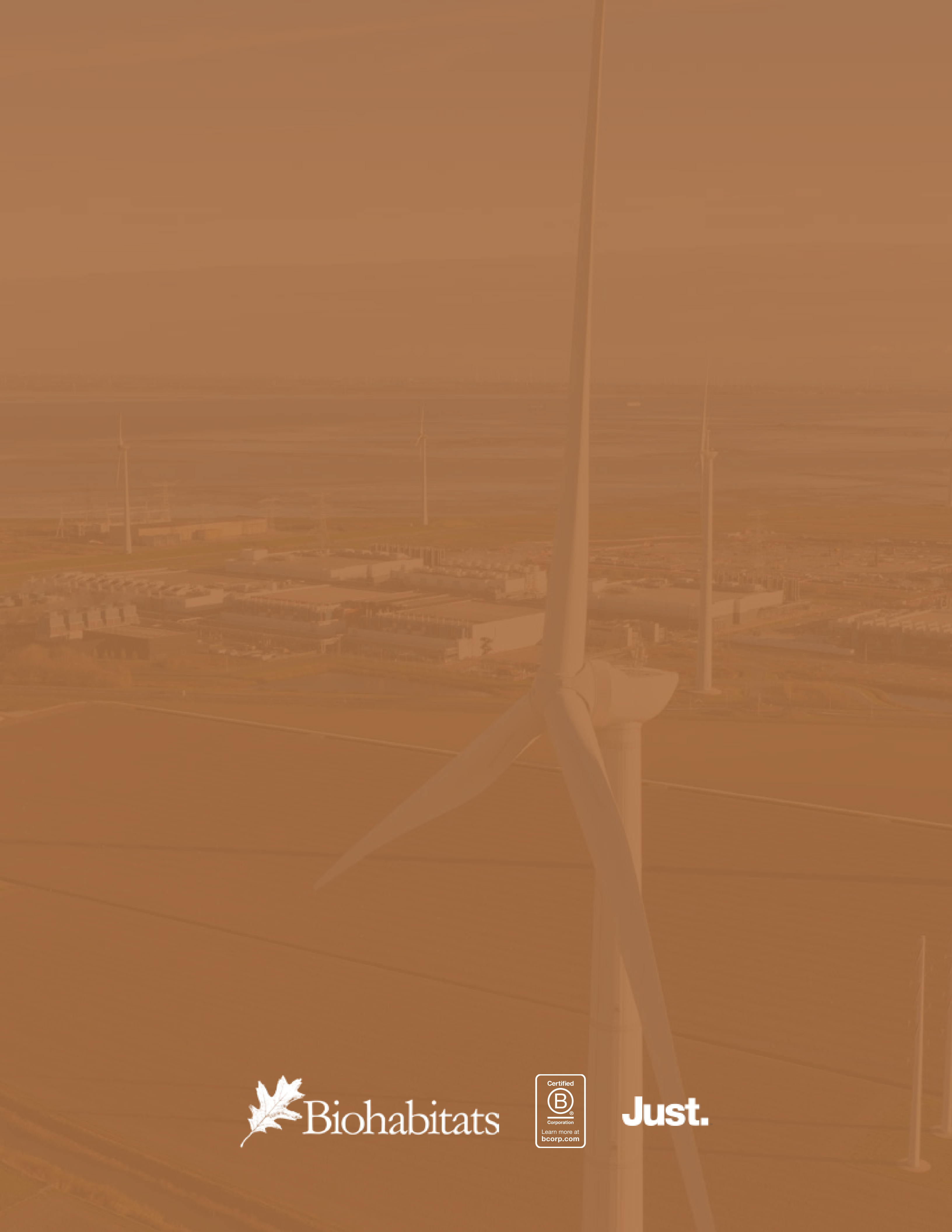
Transparency Statement

This report was conceived, researched, directed, and substantially written by the author. AI was used to assist with organization, editing, and stylistic refinement. Source material was independently reviewed and cited information was verified. Analysis, opinions, and final editorial decisions are solely those of the author.

Energy and Water Impact Statement

Based on published estimates, the AI-assisted development of this article and supporting framework likely consumed on the order of 0.5–2.0 kWh of electricity and approximately 1–5 liters of water. These estimates are necessarily approximate because energy and water use vary considerably with model architecture, prompt and response length, computational intensity, hardware, data center location, cooling systems, and electricity source. The actual environmental footprint of this work cannot currently be determined because AI providers do not disclose the operational data needed to calculate the electricity, water, carbon, and land impacts attributable to individual user sessions. Estimates are informed by recent peer-reviewed literature and the United Nations University Institute for Water, Environment, and Health's Environmental Cost of AI's Energy Use: Carbon, Water and Land Footprints.




Biohabitats
Certified
B
Corporation
Learn more at
bcorp.com
Just.