Environmental Impacts of the Proposed Wal-Mart in Blunn Creek

Prepared for

South River City Citizens

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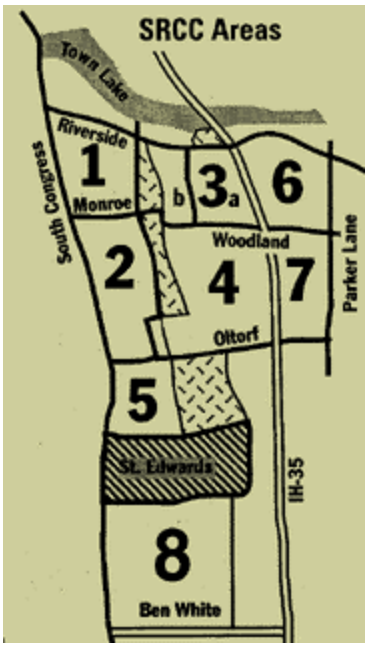
Summary of Key Points

- Blunn Creek exhibits a character that is uniquely better than other urban creeks in Austin. This high stream quality and biological activity stem from the headwaters geology that provides a steady stream of base flow into the creek between rainfall events.
- The proposed Wal-Mart would be located within a 125-acre headwaters watershed. Despite 50 years of urbanization in the rest of this watershed, the headwaters watershed remained largely pervious in 2000.
- The existing construction of Blunn Creek Apartments, Home Depot, and the proposed construction of Wal-Mart will permanently damage the character of Blunn Creek, primarily by covering the land from which 30% of the base flow is generated.
- Although there are options available to Wal-Mart to reduce or mitigate their impacts, they are currently proposing a development of minimum code compliance. Options to reduce or mitigate impacts include:
  - reduce impervious area;
  - purchase 20.24 acres of currently undeveloped land within the headwaters watershed;
  - purchase land and constructing a water quality, erosion, and infiltration facility for storm runoff from Ben White and areas within the watershed south of Ben White;
  - provide infiltrating surfaces beneath on-site water storage areas;
  - provide pervious parking;
  - depress landscape areas for storm runoff storage;
  - harvest rainwater;
  - provide a vegetated "green" roof on the building;
  - meet a higher standard for pollutant removal;
  - accommodate bicycle and pedestrian access;
  - landscape with exclusively native plants;
  - design landscaping and irrigation to conserve water;
  - implement integrated pest management;
  - light to preserve dark skies;
  - use local, recycled, and environmentally benign building materials;
  - recycle construction wastes;
  - meet requirements for community quality enhancement; and
  - implement meaningful enforcement standards.

" The 1974 preliminary ecological assessment describes Blunn Creek as having probably the most interesting vegetation, best wildlife habitat, and most diverse aquatic fauna of any of Austin's urban creeks. It concludes that as a whole it is probably more ecologically and aesthetically valuable than any other urban creek . . . and therefore should be considered among the more important and conservation-worthy ecological resources of the City. " City of Austin, 1995.

Introduction



South River City Citizens is a neighborhood organization of residents and businesses bounded by Riverside Drive, Parker Lane, Oltorf, IH 35, Ben White Boulevard and Congress Avenue. The heart of this neighborhood is Blunn Creek which flows from near Ben White Boulevard north into Town Lake. Wal-Mart, Inc. proposes to construct a 207,60 square foot superstore on 23 acres at the headwaters of Blunn Creek south of Ben White.

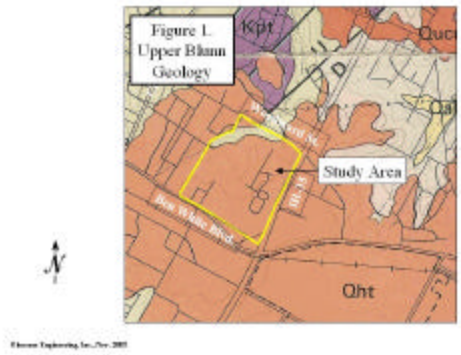
The sustained flow of clean water in Blunn Creek is a key indicator of the quality of life, the health of the environment, and of the community's commitment to protecting values that make the South Central Austin attractive and vibrant. The proposed Wal-Mart superstore construction, at an impervious cover level of nearly 80%, will permanently damage this creek and the monetary and ecological values of systems within and connected to it. While there are engineering and financial mechanisms available to either reduce or mitigate the damage of the proposed construction, at this time Wal-Mart proposes to meet a standard of only minimum City of Austin code compliance.

This report documents degradation of Blunn Creek from the proposed Wal-Mart construction in terms of increased pollutant loads, storm runoff volumes, erosion, and loss of rainfall infiltration and base flow. The analysis presented here is consistent with Austin and nationwide research on the environmental effects of the proposed development. This report also presents alternatives that could be implemented by Wal-Mart to minimize or mitigate those impacts.

Environmental Setting

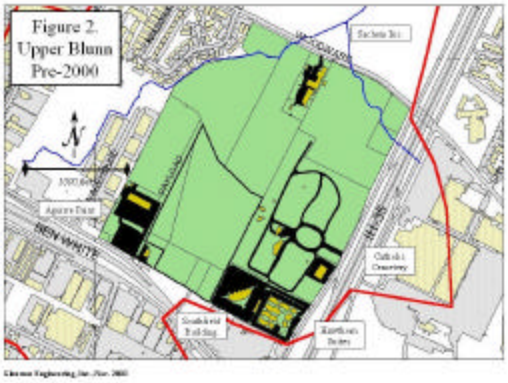
Blunn Creek is unique within the City of Austin urban creeks because, despite more than 50 years of development within the watershed, it maintains a high level of base flow and water quality. These factors maintain biological viability that is not present to the same extent within other Austin urban creeks. A primary reason for the ecological, recreational, and aesthetic value of the creek is base flow. There are two main creek reaches contributing base flow: between St. Edward's Drive and Stacy pool in the lower watershed, and between Willowrun II and Woodward Street in the upper watershed.

The importance of the upper watershed to Blunn Creek flow is illustrated by City of Austin measurements on 14 March 1995. These flow measurements indicate that 29% of the total stream flow on that day was contributed by the upper watershed reach, even though this watershed area

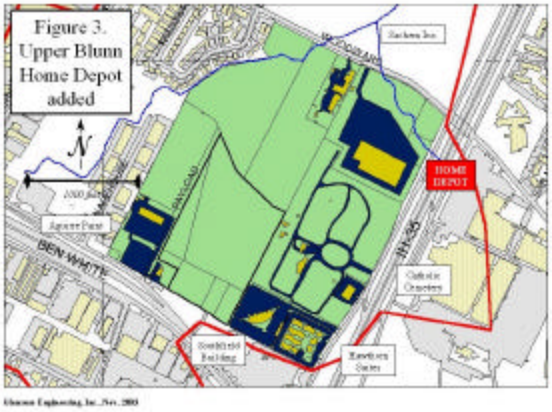


comprised only 17% of the total area. Due largely to contributions from the upper watershed area, Blunn Creek base flow is estimated at 0.3 to 1.3 cfs[1]. This base flow rate is comparable to Shoal and Waller Creeks, creeks with watersheds that are 4 to 9 times larger than the Blunn watershed. The headwaters springs that produce this base flow are critical to the on-going wetlands habitat within and adjacent to Blunn Creek.

The high levels of Blunn Creek base flow and the consequential quality of the creek occurs because the headwaters watershed is located on a geologic formation consisting of high terrace gravel, sand, silt and clay

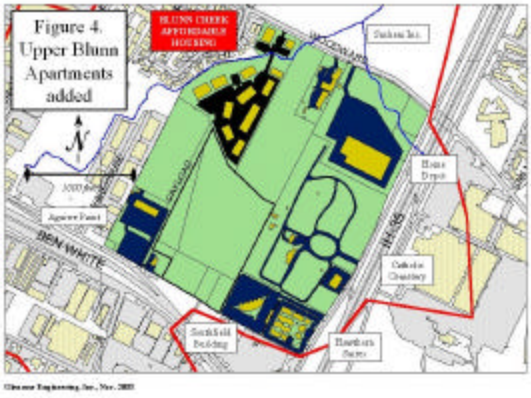


deposits (see Figure 1). These terrace deposits are more permeable to rainfall infiltration than the clay, limestone, or shale stratigraphy underlying most of Austin and the rest of the Blunn Creek



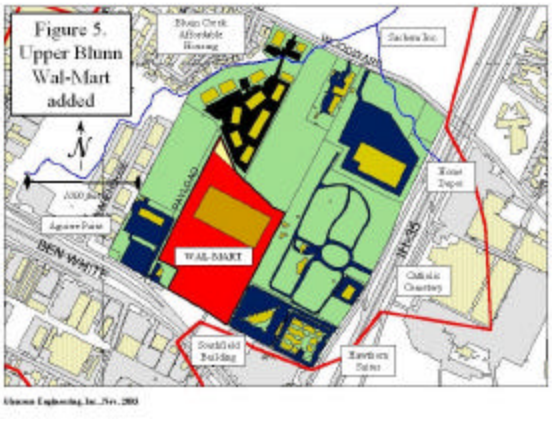
watershed. Pore spaces within the deposits temporarily store rainwater before releasing clear, clean base flow back into the Creek[2].

Until 2001, only 3.36 acres of the 125-acre Blunn Creek headwaters watershed was occupied by buildings. Roads covered an additional 14.68 acres and 107 acres were pervious. In just the last two years, Home Depot and Blunn Creek Apartment



[1] City of Austin, 1995, p. 15.

[2] Blunn Creek critically depends upon a headwaters watershed located primarily south of Woodward Street to Ben White Boulevard and west of Interstate Highway 35 to Congress Avenue. Prior to the recent construction on Ben White Boulevard Blunn Creek was also fed by rainfall on land on the south side of Ben White Boulevard. During construction, however, surface runoff that previously crossed the road location has likely been diverted around this major roadway. Furthermore, construction of the deep Williamson Creek interceptor tunnel has also intercepted shallow, perched groundwater flow from south of Ben White Boulevard that might once have sustained Blunn Creek base flow.



construction on Woodward almost doubled impervious acreage in this headwaters watershed by adding an additional 18.22 acres. The changes are summarized in the following table. Figures 2 through 5 map these changes in imperviousness in the headwaters watershed

The proposed Wal-Mart will add 18 acres of impervious cover to support a 207,5square foot superstore. The proposed impervious cover will occupy approximately 78% of the total 23 acre site. Parking islands, flood detention, and sand filtration water quality control will occupy an additional 3.49 acres. Only 1.67 acres, or 7% of the site, will remain in a natural undeveloped condition. When construction of the Wal-Mart site is completed, imperviousness will cover 57acres the headwaters subwatershed, or 46. The effect of these changes will be to permanently and significantly impair Blunn Creek base flow, erosion, and water quality, as described in the following sections.

Table 1. Imperviousness in the Blunn Creek Headwaters Watershed

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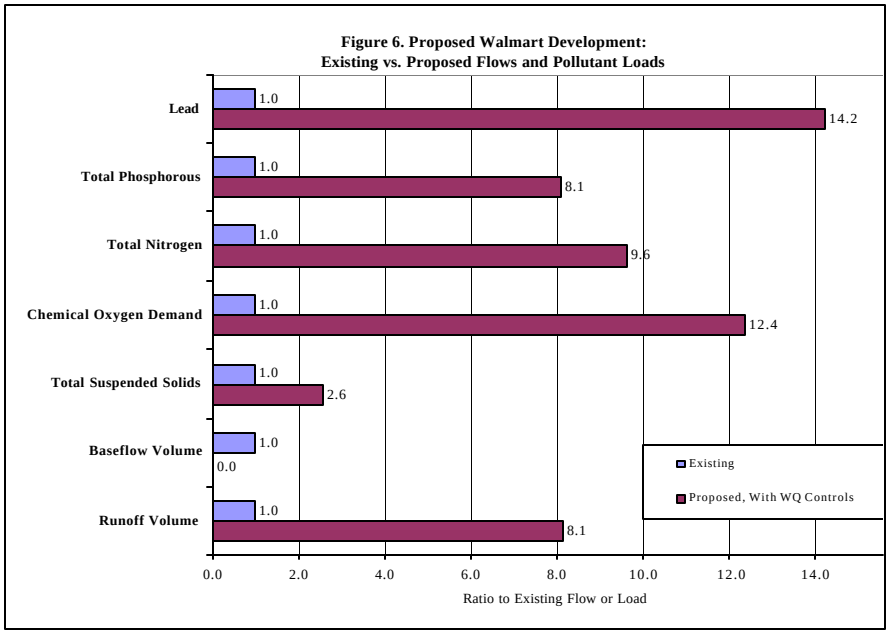
Environmental Degradation

Impervious cover increases storm runoff volumes, erosion, and water quality degradation. Impervious cover also decreases base flow. Other consequences of increased watershed imperviousness are described in Table 2.

Table 2. Stream Quality Indicators Declining with Increased Impervious Cover

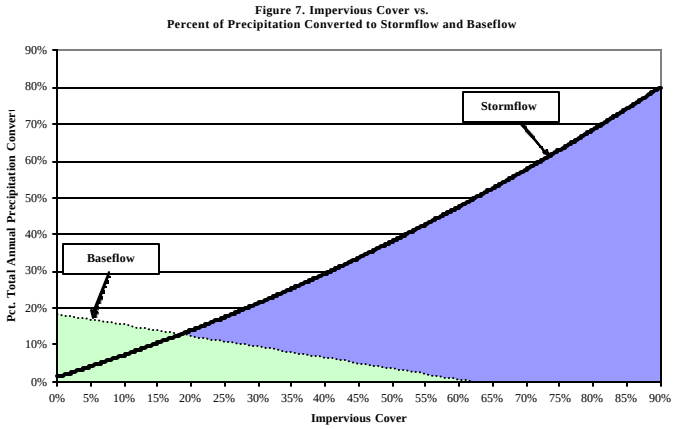
• Increased Runoff Volume	• Decline in Stream Habitat Quality
• Increased Peak Discharge	• Changes in Pool Riffle/Structure
• Stream Channel Enlargement	• Decline in Streambed Quality
• Increased Channel Modification	• Increased Stream Temperature
• Loss of Riparian Continuity	• Violations of Bacteria Standards
• Reduced Large Woody Debris	• Decline in Aquatic Insect Diversity
• Reduced Fish Spawning	• Decline in Fish Diversity
• Decline in Amphibian Community	• Loss of Coldwater Fish Species



The effects of the proposed Wal-Mart on storm runoff volumes, erosion, base flow, and pollutant loads have been calculated using the same procedures developed by the City of Austin for watershed master planning. The results of these calculations are summarized in Table 3 and on Figure 6.

Effect of Proposed Wal-Mart on Storm Runoff Volumes

The proposed imperviousness increase from approximately 11% to 78% will increase the runoff volumes from 5 to 41 acre-feet per year, a factor of 8. Figure 7 illustrates how the percentage of total precipitation converted to stormwater flow increases as impervious cover increases.



Runoff will be routed through flood and water quality controls before proceeding into waterways. This delay dampens the impacts of increased stormwater flow caused by impervious cover. Neither flood nor water quality controls, however, completely mitigate increased erosion and base flow depletion from the increased storm runoff volume.

Effect of Proposed Wal-Mart on Downstream Erosion

As more storm runoff is released from the mostly impervious Wal-Mart site, the downstream channel will begin to enlarge to accommodate increased flow volumes. This change occurs even where there is no increase in peak flow rate because peak flow rate attenuation is achieved by releasing the storm volume over a longer time period.

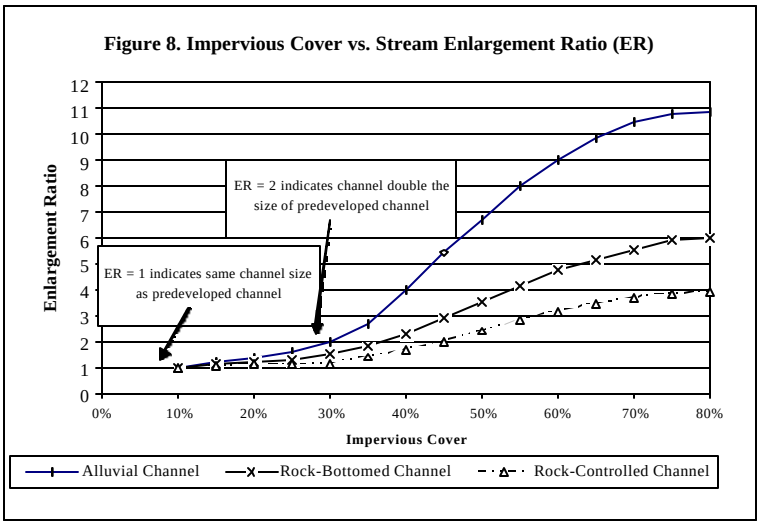


Figure 8 illustrates that the ratio of the channel cross-section immediately below Wal-Mart's proposed development to the existing channel cross-section will be 6 to 11, depending on whether the bottom of the channel is rock or alluvium. Both types of channel bottoms are found within Blunn Creek.

The enlarged channel cross-section occurs because sediment is removed from the channel walls and transported down Blunn Creek and into Town Lake. This transported sediment constitutes a degradation of water quality in these water bodies regardless of on-site water quality controls implemented by Wal-Mart. This channel enlargement effect will attenuate downstream, however, as the Wal-Mart site becomes a smaller fraction of the total area.

Table 3. Summary of the Effects of Wal-Mart's Proposed Construction On Key Environmental Indicators

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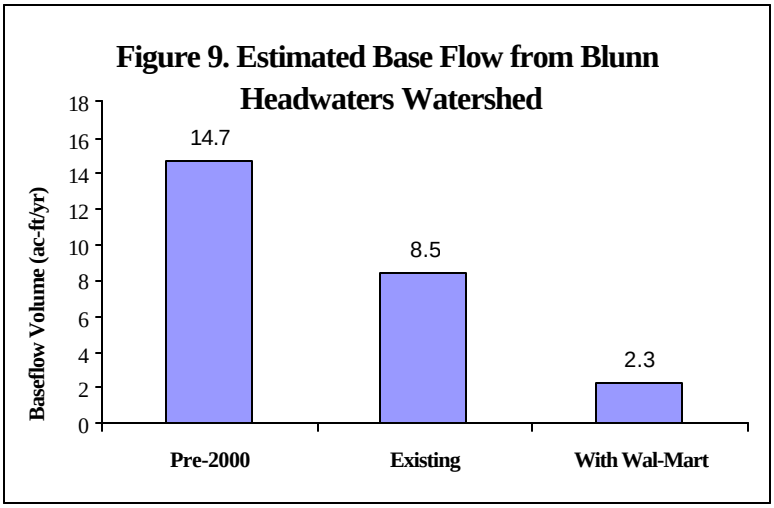
> *" . . .it appears that the quality of aquatic habitat and recreational value in Blunn Creek is superior to that of similar urbanized creeks due to the persistence and volume of baseflow in Blunn Creek."* City of Austin, 1995.

Effect of Proposed Wal-Mart on Base Flow

Base flow relationships developed from sites around Austin suggest that the currently undeveloped Wal-Mart site contributes, on average, 3.14 acre-feet per year to Blunn Creek. With the proposed Wal-Mart development with 79% of the tract covered with buildings or parking lot, the estimated base flow contribution from this tract will go to zero.

These estimates are more likely to be correct in scale, rather than in absolute value. As discussed above, base flow contribution from the site proposed for Wal-Mart is likely to be higher than other sites in Austin because of the underlying gravel, sand, silt and clay. The likely situation is that the change in Blunn Creek base flow and character will be larger than is indicated by the loss of 3 acre-feet per year. Figure 9 shows that estimates based on the entire 125-acre headwaters watershed indicate an even larger reduction in base flow than the one based on an analysis of the 23-acre Wal-Mart site alone.

Figure 9. Estimated Base Flow from Blunn Headwaters Watershed



Effect of Proposed Wal-Mart on Pollutant Loads

Wal-Mart proposes to construct the superstore to comply with existing City of Austin land development requirements for urban watersheds. These requirements are significantly less than those required in some other parts of the City. They are inadequate to protect the significant existing value of Blunn Creek as species habitat and a recreational and aesthetic amenity for the community. Table 3 presents the increased pollutant loads that will occur, even with the proposed treatment of 1.1 inches of runoff using sedimentation/filtration water quality treatment.

Options for Mitigating the Proposed Wal-Mart Development

Maintain Infiltration to Minimize Storm Runoff, Protect Against Erosion and Sustain Base flow

Alternative Wal-Mart construction designs are available to sustain existing infiltration of rainfall into the gravel, sand, silt, and clay deposits underlying the site. This type of design was one of the key recommendations of the City of Austin in the 1995 study. It is the basis for water quality and flood control design for the Blunn Creek Apartments.

Achieving this goal, however, requires one or more of the following:

- reducing impervious area;
- providing infiltrating surfaces beneath water storage areas; and/or
- providing pervious parking.

Additional protection against storm runoff volume increases and associated erosion can also be provided by storing water on-site prior to infiltration or evapotranspiration. This can be accomplished by:

- depressing landscape areas for storm runoff storage;
- rainwater harvesting, and
- providing a vegetated green roof on the building.

> *"It is recommended that ECSD seek to implement comparable infiltration enhancements and water quality controls on other vacant property in the watersheds draining to Blunn Creek south of Woodward Street by working with developers as projects are proposed through re-zoning and site plan review."* City of Austin, 1995.

Reduce Pollutant Loads

Additional pollution load reduction can be achieved by either increasing the capture volume, or improving the efficiency of water quality controls beyond that proposed by the applicant. There are several different water quality controls that achieve better pollution removal than the sedimentation/filtration controls proposed by the applicant. These include retention/irrigation, wet ponds, and pervious pavement.

"Green Building" Standards

Beyond the engineering technologies described above, there is a broad range of design and construction techniques available to be minimize construction and post-construction environmental impacts of the proposed store. Key elements of green building criteria for the proposed Wal-Mart would include:

- requirements to accommodate bicycle and pedestrian access;
- native landscaping requirements;
- water conserving landscaping and irrigation requirements;
- integrated pest management plans;

- rainwater harvesting;
- energy efficiency;
- green, living roof construction;
- lighting requirements to preserve dark skies;
- use of local, recycled, and environmentally benign building materials;
- recycling of construction wastes;
- requirements for community quality enhancement; and
- meaningful enforcement standards.

A menu of these techniques, applicable to the proposed site, is presented in the appendix.

Off-Site Mitigation

Two land tracts in the headwaters watershed remain undeveloped. The total area of these tracts is 20.24 acres. Given impervious cover limits, historical development patterns, and the completion of the Ben White road construction, these tracts are likely to develop in the near future at impervious areas of 50% to 80%. Purchase of this land or its development rights could prevent the construction of an additional 10 to 16 acres of impervious area in this sensitive watershed; helping to maintain base flow, enhance water quality and habitat, and reduce downstream erosion and flooding.

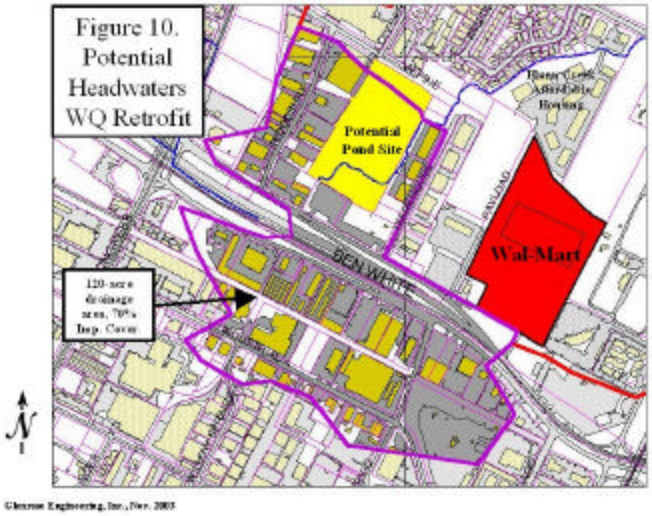


Figure 10. Potential Headwaters WQ Retrofit

Retrofit Facility

Upper Blunn Creek crosses land north of Ben White and south of Alpine. This 14.95-acre tract is owned by the Austin Independent School District (AISD) and is currently undeveloped. The 120-acre contributing area to this location was significantly altered by the enlargement of Ben White in the late 1990s. This drainage area has been intensively developed to at least 72% impervious cover.

There are currently *no controls* on development draining to this point, including the 12-lane highway. The Integrated Solutions Development Master Plan ranked a potential stormwater control on the AISD tract in Upper Blunn Creek as number 1 out of 118 possible locations in 17 watersheds. The highest rank for a facility here stems from its favorable location in the headwaters of a relatively small watershed. The impacts of this single pond would reduce erosion and improve water quality throughout Blunn Creek. It could mitigate increased erosion and scour caused by Ben White Blvd. and surrounding

development. With proper design, the facility could also enhance baseflow and possibly provide flood prevention benefits.

Wal-Mart could offset some of the negative impacts of its proposed development by supporting this retrofit facility at 3515 Willow Springs Road.

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APPENDIX A: WAL-MART
GREEN BUILDING PERFORMANCE STANDARDS

Erosion and Sedimentation Control

1. Design to meet City of Austin and EPA Storm Water Management for Construction Standards.
2. Revegetation for erosion control will be consistent with the project landscape standards. Construction traffic area soils will be aerated and amended as necessary for landscaped areas. Revegetation seed mixes will introduce only native grasses and wildflowers from the approved plant mix (see Appendix A). A contract for plant and/or seed availability must be initiated with the beginning of construction.
3. The first 50,000 square feet of construction shall be built using vegetated green roof technology.
4. Provide on-site infiltration so that stormwater volumes do not exceed existing conditions.
5. Provision of on-site storage for 2-year storm flow retention.
6. Fertilizer not more than the equivalent of 40 pounds of nitrogen per acre per year will be applied, except where greater plant nitrogen uptake is demonstrated.

Alternative Transportation

1. Design on-site transportation infrastructure with a preference toward accommodating pedestrian and bicycle transportation, and provide connecting pedestrian and bicycle pathways to off-site destinations.
2. Provide covered bicycle parking within 50 feet of each building entrance. The number of spaces compliant with City code, but not less than 5% of anticipated occupancy.
3. Provide one shower stall/changing area with independent access for men or women.
4. Evaluate the feasibility of reduced parking ratios, with a maximum of 3 spaces per 1,000 square feet.

Reduced Site Disturbance

1. Limits of construction to be defined using chain-link fence.
2. Area of construction disturbance limited to 105% of allowable impervious cover, plus all water quality and detention, drainage, and utility construction.

Stormwater Management

1. Achieve no increase in the average annual pollutant load. The controls shall be designed using the following minimum criteria:
    - As much as possible, water quality treatment should use gravity flow and passive systems. Provide diffuse, sheet flow from impervious to pervious surfaces, maximize vegetated areas, and lengthen times of concentration.

- Design depressed landscape areas adjacent to pavement and roadways to accommodate stormwater storage and treatment.
- Soil and structure suitability for infiltration shall be determined based on a field investigation including at least the following elements:
  - a minimum of 3 to 5 soil bore pits in each soil area to be used for infiltration; and
  - soil pit profiles logged and described by a soil scientist experienced in Central Texas karst soils including but not limited to soil type, presence and proportion of coarse fragments, and soil structure.
- Soil infiltration rates will be determined based either on the average published permeability value for each soil type or on field characterization.

2. Achieve no increase in stormwater runoff volume by complying with the following performance standards:
   - The first 50,000 square feet of roof construction must utilize a vegetated green roof.
   - Pervious pavement is required for at least 50% of all surface parking areas where soil depths are greater than 4 feet.
   - Connecting paths for pedestrians and bikes will be pervious, except where impervious pavement is required to meet applicable law, or where otherwise necessary to accommodate intended use.
   - Disconnect impervious cover by providing swale rather than pipe drainage, slope roofs, and parking areas to vegetated areas rather than storm sewers.

Landscape and Exterior Design/Heat Island Reduction

Shade

- Parking lot shade will be provided at a level to achieve 15% of the non-roofed areas within 5 years of construction. This can be achieved using trellises with native vines or native trees with broad canopies, using species as approved by the Lady Bird Johnson Wildflower Center (TWC).
- Shading will be provided for all pedestrian and bicycle pathways throughout the site.
- Provide EPA Energy Star roofing with initial reflectance ≥65 and 3-year aged reflectance ≥0.5 as per ASTM E408 for 75% of roofed surfaces or install vegetated roof for 50% of roof area. No copper- or lead-based roofing materials permitted.

Heat Island Reduction

- Impervious paved surfaces for parking and roadways shall be light-colored concrete.

Exterior Light Pollution Reduction ("Dark Sky" Guidelines)

- Eliminate light trespass from building site, improve night sky access and reduce development impact on nocturnal environment.
- An exterior lighting plan is required for all development. Design lighting such that lighting levels do not exceed IESNA foot-candle levels. Lighting of architectural and landscape features is prohibited. Maximum lighting levels for commercial areas is no more than 3 foot-candles, average maintained, measured horizontally at finished ground level with a 4:1 illumination ratio.
- Free standing light fixtures shall not exceed 30 feet measured from the ground/pavement to the bottom base of the fixture.
- Fixture wattage shall not exceed 350 lamp watts. Lamps shall be those containing the lowest available mercury content at the time of purchase, consistent with fulfilling performance requirements.
- Fixtures shall be limited to two per pole, shall have no uplight, nor lamps/light-refracting lenses extending below the plane of the lowest point of the fixture housing. Fixtures will provide a cutoff not to exceed 90 degrees from nadir so that light is not emitted above the horizontal plane.
- Building-mounted wall packs shall not exceed a lamp wattage of 200 watts, shall be mounted no higher than 28 feet from the ground/pavement to the bottom of the fixture. Wall packs shall be configured with a full front metal shield with a sharp cutoff of 85 degrees or better to block the lamp source from line of sight view. Open faced wall packs of any wattage or size are prohibited.
- No direct-beam illumination can leave the site, nor be projected into the sky. All lighting fixtures to illuminate outdoor advertising shall be mounted on the top of the sign structure.
- Lamp wattage for outdoor advertising signs constructed of translucent materials and wholly illuminated from within shall not exceed 75 watts.
- All luminaires mounted on the undersurface of service station canopies shall be fully shielded and utilize flat glass or flat plastic covers. The total light output used for illuminating service station canopies, defined as the sum of all under-canopy initial bare-lamp outputs in lumens, shall not exceed forty (40) lumens per square foot of canopy. All lighting mounted under the canopy, including but not limited to luminaires mounted on the lower surface of the canopy and auxiliary lighting within signs or panels over the pumps, is to be included toward the total outdoor light output.
- Wal-Mart must submit to the City for approval plans indicating the location, the type of illuminating devices, fixtures, lamps, supports, reflectors, and other lighting devices, descriptions of illuminating devices, and photometric data.

- City of Austin specifically waives any code lighting requirements that conflict with these Dark Sky (www.darksky.org/) standards.

Use of Native Plant Species and Materials

Native plants provide numerous benefits to the overall health of the environment. Valuable for more than just their aesthetic beauty, because their use reduces energy costs, water, and maintenance, native plants are economically beneficial. By enhancing ecosystem stability, creating habitat, and reducing chemical use, native plants provide ecological benefits.

- Utilize native plant species adapted to the soils and climate of the site and planted in assemblages that take advantage of specific site conditions (e.g., water-loving plants in natural or created drainages, xeric plants on slopes and ridgelines) to reduce or eliminate reliance on supplemental water, fertilizer or pesticides.
- For *commercial properties*, no more than 10% of the species occupying no more than 15% of the landscaped square footage (presumed mature canopy cover) can be selected from List 1. Ninety percent of the species and 90% of the square footage of the planted landscape must be selected from List 2.

Green Gardening

City of Austin Green Gardening principles will be used in the landscape design including but not limited to the delineation of hydrozones, proper soil preparation, and the use of mulches.

Irrigation System

The following criteria apply to landscape irrigation. An irrigation plan will be developed and implemented incorporating the following minimum components:

- non-municipal treated water for landscape irrigation, such as captured rainwater or recycled site water (from sinks and drinking water fountains) must be piped to a minimum 50% of landscaped office area;
- only drip irrigation water delivery allowed;
- design to minimize evaporation by using techniques such as low water delivery pressure, large drop size, and delivery near to the ground);
- specification of water zones based on plant needs, and rain shut-off devices;
- the irrigation controller located within visual sight of the irrigated area, to the greatest extent practicable;
- three seasonal watering schedules (spring, summer, and fall); and
- the watering cycle to begin in the early morning and end by 10:00 a.m. to minimize evaporation and fungus growth.

Maintenance of Landscaped Areas

- Maintenance of landscaped areas will use electric mowers and equipment to the extent practicable.

Integrated Pest Management

- An Integrated Pest Management (IPM) plan will be developed and implemented for the site using City of Austin standards. The plan will address both construction and post-construction chemical use.

Materials

- Recycled materials will be used to the greatest extent feasible for planters, benches, and stonework.
- No materials that leach pollutants, such as creosote-treated railroad ties and CCA- (copper chromated arsenic) and pentachlorophenol-treated wood will be allowed. For wood in contact with soil, an approved treatment method, such as ACQ (ammonium copper quaternary), naturally-resistant wood, or a wood-plastic composite will be required.
- Topsoil from the site will be stockpiled within a silt-fenced area.
- Excavated boulders will be stored and incorporated into the site landscape to the extent feasible.
- Woody plant material will be used on site either for fence posts and trim, or mulched and used on site for paths and planting beds to the greatest extent practicable. All woody plant material not used on-site will be made available for off-site use. None of the woody plant material will be disposed of in a landfill.

Water Use Reduction

Rainwater Harvesting

1. Roof design will allow capture of at least 80% of the roof area for rainwater harvesting. Rainwater collection and storage will be provided for at least 1 inch of capture volume provided, however, in no event shall such facilities be required to exceed a maximum cost of $4,000 (with annual growth rate of 2%) per 10,000 square feet of the roof area.
2. Roof-mounted HVAC equipment must include containment and capture of any leaks.

Other Strategies

Establish a project water use baseline and prototypical specifications for plumbing fixtures including waterless urinals, dual-flush commodes and lavatory sensors to achieve a minimum 20% water demand reduction compared to the 1992 Energy Policy Act fixture performance requirements.

Energy and Atmosphere

Minimum Energy Performance

Achieve a project energy performance baseline equal to 30% improvement over ASHRAE 90.1-1999.

Regulate energy components for passive systems, HVAC systems, building envelope, service hot water, lighting, day lighting and other regulated systems. Model building against base case of minimum prerequisites.

CFC Reduction in HVAC&R Equipment

Zero-use of CFC-based refrigerants in all commercial development.

Renewable Energy

An evaluation must be conducted of opportunities for on-site energy generation, such as with solar photovoltaics.

At least 50,000 square feet of the retail development must supply 5% of the total energy demand (based on annual energy cost) with on-site renewable energy systems.

Elimination of HCFC's and Halons

HVAC and refrigeration equipment and fire suppression systems must not use HCFCs or Halon where a non-ozone depleting alternative is available.

Measurement and Verification

Continuous metering of the following is required: lighting systems and controls, constant and variable motor loads, variable frequency drive operation, chiller efficiency at variable loads, cooling load, air and water economizer and heat recovery cycles, air distribution static pressures, ventilation air volumes, boiler efficiencies, building specific process energy efficiency systems and equipment, indoor water risers and outdoor irrigation systems.

Green Power

Grid electricity must be purchased from renewable sources that meet Center for Resource Solutions Green-E requirements (solar, wind, geothermal, biomass, low-impact hydro) where they are available. Austin Energy's GreenChoice is an example of such an option.

Materials and Resources

Storage and Collection of Recyclables

All buildings must provide an easily accessible area dedicated to separation, collection and storage of recyclable materials including, at a minimum, paper, glass, plastics, and metals. For office and retail establishments that are clustered, a centralized recycling collection area must be located within 100 feet of the individual establishments. The size must accommodate a 75% diversion rate, easy collection and cleaning. A convenient path must be identified from the recycling locations to a loading dock or similar area.

Construction Waste Management

A waste management plan must be developed and implemented to divert at least 50% by weight, all construction, demolition, and land clearing debris to salvage or recycle. The plan must identify licensed haulers, processors, and salvage markets, as well as strategies for source reduction, recycling, salvaging, or reusing construction materials. An evaluation must be done of the feasibility of achieving a 75% by weight recycling goal.

All woody material cleared from the site must be mulched and beneficially reused. All vegetative materials must be composted.

Resource Reuse

Options for using salvaged or refurbished materials must be evaluated, with a minimum goal of 5% of building materials from these sources based on dollar value.

Recycled Content

At least 50% of building materials, based on cost, must contain in aggregate a minimum of 20% post-consumer recycled content based on weight. Project specifications and contractor submittals must highlight material recycled content. A spreadsheet must be provided of all materials used in construction indicating percentage of pre- and post-consumer recycled content, costs of all materials, and calculations demonstrating the percent of building materials having required recycled content.

High volume recycled content is available and recommended for these materials: steel (95%) concrete (50% of the 12% that is cement), drywall (95%) and aluminum (>50%). Recycled content materials must be evaluated on a life cycle basis.

Austin Energy's Green Building Program (www.ci.austin.tx.us/greenbuilder/) has more information on green building products, materials and practices.

Local/Regional Materials

All insulation, stone, steel, concrete, and drywall must be purchased from sources within 300 miles, except where no such sources exist.

Specifications and contractor submittals must be provided indicating local materials installed; including a spreadsheet of all materials highlighting locally manufactured ones, the manufacturer location, distance to project site, costs for all materials and calculations demonstrating that at least 20% of materials are manufactured within 300 miles of the project.

Rapidly Renewable Materials

Specifications and contractor submittals must be provided indicating rapidly renewable materials installed; including a spreadsheet of all materials highlighting rapidly renewable ones, the manufacturer location, rapidly renewable documentation, costs for all materials and calculations demonstrating that at least 20% of project materials are rapidly renewable.

Certified Wood

At least 50% of wood-based materials must be certified by Forest Stewardship Council, or another independent, third-party certifier recognized by the U.S. Green Building

Council. This includes but is not limited to framing, flooring, finishes, furnishings and non-rented temporary construction applications like bracing, concrete forms, and pedestrian barriers.

Indoor Environmental Quality

Minimum IAQ Performance

All commercial and retail construction must meet minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda.

Provide a letter certification by a mechanical engineer stating compliance with ASHRAE 62-1999 and declare the ASHRAE 62-1999 procedure used in the Indoor Air Quality analysis. The letter must include design criteria and assumptions.

Low-Emitting Materials

Adhesives must meet or exceed VOC limits as per South Coast Air Quality Management District Rule #1168 (www.aqmd.gov/rules/html/r1168.html.

Sealants used as filler must meet Bay Area Air Resources Board Regulation 8 Rule 51 (www.baaqmd.gov/regs/rg0651.pdf.

Paints & coatings to meet or exceed VOC and chemical component limits of Green Seal (www.greenseal.org/standard/paints/html).

Composite wood and agrifiber products must contain no added urea-formaldehyde resins.

Cut sheets and/or Material Safety Data Sheets must be provided for all adhesives, sealants, paints, coatings, composite wood, agrifiber products, and carpet demonstrating compliance.

Thermal Comfort

Comply with ASHRAE 55-1992, Addenda 1995, for thermal comfort standards including humidity control within established ranges per climate zone.

Install permanent temperature & humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in building.

Daylight and Views

Achieve Daylight Factor of 2.0 (excluding direct sunlight penetration) in 75% of all space occupied for critical visual tasks. Installation of skylights in a Wal-Mart “experimental ecostore” in Lawrence, Kansas resulted in significantly higher sales per square foot (www.solaglobal.com/industry.tips.01.htm).

Community Quality

1. Provide areas for public community gardens and open spaces.
2. Provide instructional signs of sustainable technology used.

3. Provide a living wage to all workers, provide health care and domestic partner benefits, and agree to a neutrality position if employees initiate union organizing efforts.
4. Include edible, food-producing landscape.

Innovative Techniques

- No CCA-, creosote-, or penta-treated wood products.
- No materials releasing persistent bioaccumulative and toxic chemicals (PBTs) into the environment except mercury in fluorescent and halide bulbs, where only bulbs with lowest available mercury (e.g., Philips) are allowed. Polyvinyl chloride (PVC), lead and cadmium products are not allowed, unless an exception is justified. On-site collection area for mercury-containing bulbs is required.
- Ceiling tile must not promote mold/mildew growth.
- Vegetative filtration strips must be place below all roof eaves to filter water and avoid run-off.
- Designs must minimize the use of finish materials.
- Designs must accommodate on-site food production and community composting.
- No turf permitted on commercial projects.
- All paving must be concrete rather than asphalt.
- No termiticides are allowed. Termite prevention must be based on barrier methods.

Enforcement

Certain provisions of these standards may conflict with City of Austin rules and regulations. Approval of the zoning ordinance incorporating these standards constitutes a waiver by the City of all ordinances, rules, and regulations that would result in a less stringent environmental standard.

All construction must implement best practice commissioning procedures: engage a commissioning authority, develop a design intent and basis of design documentation, implement a design based on the design intent document, and verify installation, functional performance, training, and documentation. Complete a commissioning certification report prior to receiving Certificate of Occupancy.

The following commissioning tasks by a party independent of the designer are required:

- review of design prior to construction document development;
- review of construction documents when close to completion;
- selective review of contractor submittals for commissioned equipment;
- review of recommissioning manual; and
- near warranty end or post-occupancy, a verification of performance.