**COMMENTS ON EXISTING GREEN ROOF FACT SHEET, PP. 350-351**

Under Sub-Heading “Design Criteria”

* Modular products do not necessarily increase installation and repair efficiency

Under Sub-Heading “Benefits”

* Add local food production (see Task 4 for more on rooftop agriculture), decreased stormwater utility fee, and aesthetics to potential benefits
* Needs to emphasize that green roofs can be used for stormwater treatment in many areas where other LID techniques might not work, eg in redevelopment projects with limited open space, areas with high bedrock, karst topography, contamination.
* change “insulate buildings” to “Can significantly lower building energy costs”
* Create gardens even where open space is not available at grade
* beneficial in hospitals in the following ways (summarized from Ulrich 2002, bold added):
* “There is considerable evidence that restorative effects of nature scenes are manifested **within only three to five minutes** as a combination of psychological/emotional, many views of vegetation or garden-like features elevate **levels of positive feelings (pleasantness, calm**), and **reduce negatively toned emotions such as fear, anger, and sadness**”
* “laboratory and clinical investigations have found that viewing nature settings can produce significant restoration **within less than five minutes** as indicated by **positive changes,** for instance, in, **blood pressure, heart activity, muscle tension, and brain electrical activity** “
* Several studies have also found that views of nature in hospitals could enhance clinical or medical outcomes, such as, for example, **shorter hospital stays, far fewer doses of strong narcotic drugs, fewer minor post-surgical complications**.
* In addition to ameliorating stress and improving mood, gardens and nature in hospitals can **significantly heighten *satisfaction* with the healthcare provider and the overall quality of care**. Evidence from studies of a number of different hospitals and diverse categories of patients (adults, children, and elderly patients; ambulatory or outpatient settings, inpatient acute care wards) strongly suggest that the presence of nature –indoor and outdoor gardens, plants, window views of nature – increases both patient and family satisfaction.
* “hospital gardens also **increase staff satisfaction with the workplace**, and can be advantageous in hiring and retaining qualified personel.”

Under Sub-Heading “Limitations”

* Edit “Cost is higher than traditional roofing systems” to “Initial capital cost is higher…”. Add something like, “However, considering lifecycle costs may make green roof a more attractive investment due to increased roof lifespan, increased energy efficiency, and stormwater benefits.”
* Wind: ANSI/SPRI RP-14 Wind Design Standard for Vegetated Roofing Systems, available at [www.spri.org](http://www.spri.org), gives guidelines on how to design to minimize wind damage in green roofs, including, for example, how to evaluate what roofs are too windy for a green roof, and where a green roof may need extra wind protection.
* Building codes and insurance

Under Sub-Heading “Description”

* Extensive systems typically have 6” or less of growing medium (manual currently says 4)
* After “Any remaining runoff filters through the growing medium and is drained away from the roof’s surface by the drainage layer” mention that this water can be captured in cisterns to irrigate plants or for other re-use purposes.

Appendix E

Under Sub-Heading “3. Green Roofs”

* It says “Extensive Green Roofs…are more appropriate of urban rooftops” – is this true? Usually more feasible but not necessarily more appropriate.
* Add note saying that plant species and diversity can affect ecological function (e.g. Lundholm et al, 2010, Compton and Whitlow 2006)

Table E.3

* Delete plants that are not hardy to Zone 4.
* Add native species that have performed well on some Minnesota extensive green roofs (to be included in task 4 )