Proposed Revisions to the future 12th Edition of Keys to Soil Taxonomy
Based on: ICOMANTH (International Committee for Anthropogenic Soils)

Brief Explanation of Changes:

Chapter 1. Changes within the definition of buried soils to identify plaggen epipedons and 50 cm of human-transported material (HTM) as mantles because they are new materials by definition.

Chapter 3. Changes to horizons and characteristics of mineral soils
Revise: Epipedons to redefine the anthropic epipedon, and exclude the mollic and umbric epipedons from forming in HTM.

Changes to diagnostic horizons and features for both organic and mineral soils
Add: Artifacts
Add: Human-altered Material
Add: Human-transported Material
Add: Manufactured Layer
Add: Manufactured Layer Contact
Add: Surface Mantle of New Soil Material

Chapter 5-16. Changes to Keys of Multiple Orders to reclassify Arents as Orthents and delete empty taxa above the subgroup level for human-altered and human-transported (HAHT) soils. This provides consistency of the level that HAHT soils are categorized across all orders, and allows other important properties to be recognized at the great group level and above. HAHT soils are expected at the subgroup level in all orders except Mollisols.

Throughout Soil Taxonomy
Modify: Irregular decrease in OC criteria to exclude HTM. This prevents HAHT soils from being misclassified with soils that have a natural irregular decrease.
Add: New subgroups choices for human-altered and human–transported soils to provide logical subgroups of HAHT soils already observed (e.g., soils with plaggen epipedon materials, human-altered materials, human-transported materials, anthraquic conditions, and high carbon equivalents).

Chapter 17. Changes to Family Criteria
Add: Human-altered or human-transported material class to recognize 18 types of important and unique properties of soils with at least 50 cm or more or throughout the soil if less than 50 cm to a lithic or paralithic contact.
Modify: List of root-limiting layers to include manufactured layer contact.

Proposed an ad-hoc amendment to Part 629: Glossary of Geologic Terms, National Soil Survey Handbook, to add anthropogenic landforms and microfeatures that are needed to help identify properties of HAHT soils.
Background:

Summary of Circular Letters 1-6:

1. Anthropogenic soils were redefined as human-altered or human-transported (HAHT) soils with profound, intentional alteration either to 50 cm or more or throughout the soil if less than 50 cm to a lithic or paralithic contact.
2. Human-transported material (HTM), manufactured layers, and artifacts were defined.
3. Terms were defined for describing HAHT soil horizons, artifacts, and textures with high amounts of artifacts.
4. The ICOMANTH web site was established, literature reviews, pictures, and data added.

Summary of proposed changes in Circular Letters 7:

These proposals originate from Circular Letter 7 of ICOMANTH (International Committee for Anthropogenic Soils), a committee commissioned by USDA NRCS in 1988 to introduce differentiae and taxa for classification and survey of observed human-altered and human-transported (HAHT) soils. These soils form through profound, intentional alteration or transportation of materials, and do not include soils altered unintentionally or chemically treatment standard production agriculture practices. The charge of the committee was to introduce what have been called anthropogenic soils by others into US Soil Taxonomy, to facilitate mapping of urban areas, introduce new terms and materials into NASIS, allow meaningful interpretations for unique materials and soils, and ease establishment and correlation of new soil series. The adjectives human-altered and human-transported are preferred because all soil genesis processes are natural. Humans may generate new materials and add them to the environment, but humans only affect, they do not generate biogeochemical processes in natural settings where soils form (pointed out by Hari Eswaran, personal communication). These proposals attempt to distinguish HAHT soils from other soils based on field properties, a challenge posed by Richard “Dick” Arnold. Major contributions came from John Sencindiver, West Virginia University, Delvin Fanning, University of Maryland, Luis Hernandez, Steve Fisher, Craig Ditzler, and Joe Chiaretti, USDA-NRCS.

An important aspect of Soil Taxonomy is that establishing soil series is easier if no new taxa above the family level must be created beforehand. Proposing a new series while proposing a new taxa at order, suborder, great group, or subgroup level requires supportive data and lengthy review, and still requires additions of classes at the family level to support important separations and produce unique interpretations. Interpretations for mapping are not based on higher taxa, but rather on properties recognized at the family level and below. Meanwhile, tentative series are “misclassified” into a taxon that is seldom appropriate, then they are reclassified at establishment. This is not conducive to progressive correlation during soil mapping. Adding a new family class for HAHT soils rather than trying to make them fit into classes created for prototypic (from Greek prōtos, first, ancestral, original) soils. Proposing new soil series by choosing among HAHT family classes, however, can be done easily and rapidly, with correlation and review conducted in a regionally-structured USDA-NRCS setting. Once established and data collection begins, the appropriate subgroup from a proposed set of standard choices is possible, and is supported by data.

There is no intent to introduce a new soil order (a top-down approach). A top-down approach leads to branching and proliferation of taxa in order to reach the series level. The
HAHT soils undoubtedly occur in all orders except Mollisols. The proposed changes will take place by adding new diagnostic materials characteristics and terms, at the subgroup and family level, leading to easy establishment of soil series. The intent of these proposals are to introduce taxa at family and subgroup levels only, a bottom-up approach. The bottom-up approach allows multiple choices of family classes to differentiate series in urban and rural landscapes, yet minimizes proliferation of new taxa. The bottom-up approach preserves existing taxa and concepts at higher levels that are proven, and does not lead to the splitting of existing series concepts. However, as we correlate and add new series, produce soil surveys, populate data in NASIS, and add standards in the USDA-NRCS soil survey program, the subgroups for HAHT soils can later be separated at higher levels of the classification system.

Although emphasis is placed on the USDA-NRCS soil survey program, the proposed changes should apply globally. Supporting and improving the system that supports and updates soil taxonomy has allowed it to be useful in increasingly more countries, proof that the concept is valid and not exclusive to global use. The proposals will make it easier for new users of soil taxonomy to begin using the system and propose soil series and produce interpretive maps. A very important basis for these proposals is that when a Universal Soil Classification system is created, it will require correlation between systems. Finding HAHT soils would be confusing if almost all are classified at various levels of taxa from suborder through subgroup. Finding HAHT soils would be even more difficult if they are recognized only at the series level. There are almost 24,000 series and no facility to consistently identify if they contain evidence of human-altered or human-transported properties besides individual inspection. However, it will be easy to query for and then correlate these soils if they occur in meaningful family classes and a few standard subgroups.