In 4-516 accessory uses item a- add that municipal or governmental branch or leaf collection are considered source material. Boulder County will maintain a list of certified third parties that qualify as source materials.

In 4-516 Strike g

In 4-516 add in a new a: In Accessory Agricultural Composting, composting and composting incidental to operations are exempt from setback regulation when: (i) under 50 cubic yards of material is being processed

In 4-506-5-b_ modify to be a sub set of a (so roman numeral 4) read: the organic materials are limited to leaves, tree trimmings, untreated wood, or shrubbery cuttings.

Commissioner Stolzmann's Comments provided in writing to the Board - 10/12/23

Testimony Regarding Proposed Land Use Code Amendments:

Land Use Code Text Amendment 4-506.A; Composting Incidental to Farming Operations Docket DC-23-0002, Submitted 11 October, 2023

Submitted by Richard Andrews, representing myself, Boulder County resident; and as

Registered Professional Engineer Colorado #11923, since 1971 (chemical/environmental);

Managing General Partner: Jessie M. Andrews Family Organic Farm, 6803 Jay Road;

President/Founder: Boulder Innovative Technologies, Inc. and subsidiary, ZeoponiX, Inc.

Executive Summary Comments:

Overall, it is very important for Boulder County to update and improve upon the Land Use Code to encourage high quality composting of suitable organic materials to:

- ➤ Reduce the climate damaging greenhouse gas (GHG) emissions that otherwise occur from landfilling of organic wastes, notably methane, nitrous oxide, and other gases; and
- > To support the rapid transitioning to soil regenerative organic agriculture on lands in Boulder County by enabling local on farm composting; particularly for all Open Space lands; and
- > To assure that the foods and feeds produced are not contaminated from recalcitrant toxins in the compost feedstock materials that can transfer into foods and feeds grown on lands/soils amended with composts: and
- > For the companion benefit of the elimination of environmentally and public health damaging synthetic chemical fertilizers and pesticides with mainstream agriculture, achieved by amending chemically damaged soils with high quality composts; and
- Preventing the major greenhouse gas emissions from agriculture, and destruction of soil health, and pollution of air and water caused by synthetic agricultural chemicals.

While the proposed changes to the Land Use Code of the Community Planning and Permitting (CP&P) Department were ostensibly intended to achieve these goals, they are unfortunately inadequate, and not even solidly founded on biological/environmental/engineering sciences, and proven established composting methods to achieve these stated objectives.

The proposed rules do not appropriately deal with the above stated objectives in the actual text of the rules. Instead, they focus on nearly meaningless matters such as the mass or volume quantities of compostable materials allowed in any given time period, the size or volume of compost piles and quantities of compostable materials on site, and the location of piles in relation to property boundaries. The proposed limits are simply not based on the appropriate, meaningful, practical, or science and engineering measures to assure high quality composts and avoidance of unwanted negative side effects of composting.

Unfortunately, the various proposed rule limitations on quantities of composts allowed to be produced do not serve the interests of either the farms nor users of quality composts produced and used locally, nor the protection of the environment. Notably regarding quantity limits on compost:

- > The quantitative limits of compost production on any property should be based upon the acreage and farming needs for specific farm properties to amend soils, not an arbitrary maximum allowed quantity of compost allowable or produced in a given time frame.
- A farm of tens, hundreds or even thousands of acres should not be constrained to an arbitrary maximum quantity of compost it can produce, but instead on the needed compost quantity to amend soils, and to serve the actual need for compost product sales off site to other users.

The proposed set back rules were likely based on a false premise that composting is odorous and therefore objectionable to occupants of nearby properties

- Odors from composting only occur due to improper operation of composting, primarily failure to ensure that anaerobic (insufficient aeration) and moisture conditions do not occur, or that appropriate engineering designs of the composting processes are not designed & engaged.
- > CP&P rules and county farmer educational programs should be the focus on ensuring proper design and operation of composting instead of inappropriate limitations on locational setbacks.
- > The arbitrary set back from property lines is unreasonable and unnecessarily constraining. It is notable for many farms have long narrow or irregularly shaped property boundaries for which the proposed 300 foot setback would totally prohibit the farm from conducting any composting at all. This situation occurs on many farms in my immediate area of the county, including my own organic farm which would be prohibited from conducting composting to serve its needs.

A focus on properly designed and conducted composting methods to achieve quality composts with environmentally sound practices should be underlying the elements of any composting rulemaking. This is common with many other rules by CP&P, such as construction of property improvements,and all rules need to be solidly based on good science and engineering.

- There is a wealth of documented research, development and demonstration (RD&D) on how to properly conduct composting of organic materials available from many reputable sources, and published in the peer reviewed scientific and engineering literature.
- I personally have amassed a major collection of such literature over the last 30+ years, and I have consulted and conducted science/engineering studies for private and governmental clients on this subject In Colorado and elsewhere.
- I'm offering with this testimony to share this know how, scientifically based resources and experience with the various departments of Boulder County, across not just CP&P, but with the many other county departments such as OSCAR, Public Works, County Health Department, Parks and Open Space, etc.

I previously provided much more detailed comments to the CP&P advisory board hearing and other departments on 16 June 2023; and can provide those again upon request.

Closing Comment: Finally, it is my strong recommendation that the current proposed rulemaking for composting in Boulder County NOT BE ADOPTED AS PROPOSED. It needs to be significantly rewritten to deal sensibly and based on science and established technical knowledge on how to properly design and conduct composting for its many climate, environmental and public health benefits that can come from quality composting use in our county, and as an example to other cities and counties in Colorado and beyond.

Richard D. Andrews, mobile # 303 918 8297, rich@zeoponix.com

FINAL-AS SMBMITTED 6/16/2023

Analysis of and Recommendations for Improving

Proposed Boulder County Composting Code Land Use Amendments

Submitted to Boulder County Departmental Staff of CP&P (and Planning Commission), OSCAR, BCPOS, Public Works, Boulder Public Heath, and Boulder County Commissioners

Submitted 16 June 2023

Introduction -

Thank you for the opportunity to provide comments on proposed land use code changes regarding composting. And a special thank you to Sabrina Torres for coming to the Andrews Farm recently to meet and discuss the code changes with Richard Andrews, Alan Lewis, and via phone with Mary Mulry. All of us are founding members of the *Organic Land and Food Coalition* (OLAF), as well as all of us having previously been appointed by County Commissioners to serve on advisory committees to Boulder County (Cropland Policy Advisory Group (CPAG), or Food and Agriculture Policy Council (FAPC)).

The following comments and recommendations are offered regarding the recently proposed Land Use Code revisions related to composting on lands in Boulder County, for three land use/zoning categories:

- Industrial scale Composting (A and GI zones)
- > Accessory Agriculture Composting (F, A, RR, ER, T, B, C, LI, GI, MI zones)
- Backvard Composting (all zone districts)

Executive Summary of Comments and Programmatic Recommendations –

The currently proposed composting changes by the Boulder County Community Planning and Permitting Department (CP&P), released for public review Spring of 2023, while well intentioned, are unfortunately technically insufficient and even in some instances obstacles to achieving many of the objectives outlined by Boulder County.

Overall, the proposed rulemaking is considered well intentioned, clearly acknowledging the outdated current land use rules related to composting in Boulder County. However, the new proposed land use rules do not address nor likely achieve most of the **Key Purposes**, **Principles** and **Justifications** for quality composting practices which we review in this document; notably for guiding and ensuring exemplary, appropriate and scientifically supported, proven composting practices to encourage and ensure maximum benefits in Boulder County, and even being leaders for replication beyond our county. Some of those goals are:

- > Key goals of Boulder County government notably are to:
 - protect the public health, welfare, and safety, including reducing contaminants in our air, water, soils, foods, atmosphere;
 - protecting companion native wild species and ecosystems from pollution of the environment;

- reducing greenhouse gas emissions (GHG) from agriculture and land use practices, including reducing our collective impacts on out climate from accelerating warming consequences from wastes we produce
- restoring degraded soil health and associated capacity to sequester carbon to reduce global warming effects and consequences
- encouraging & practicing regenerative organic agriculture for highest quality foods and feeds with lowest environmental impacts.
- Unfortunately, the currently proposed revisions to land use codes fall short in meeting these above noted goals, and in some cases discourage and even prohibit desirable benefits and practices of increased high-quality composting in Boulder County.
- In general, the proposed code changes are far too focused on simply measured but nearly unmeaningful measures of acceptable performance & practices of composting, regardless whether applied to the newly revised three composting categories of: (a) Industrial Uses, (b) Accessory Agriculture, or (c) Backyard Composting. The narrow and limited foci of the proposed rules for all three categories of composting practices are limited to:
 - o limits on measurable quantities of active composting materials at any one time.
 - o maximum quantities of finished composted materials that can be "removed" from site in a specified time frame.
 - o Minimum set back distances from adjacent properties.
 - And to some extent the allowable compostable input materials that are allowed by different categories of operators.

Unfortunately, these limited regulatory foci will not ensure the desired best available practices and achievement of multiple desirable goals. The proposed land use rules/code seem to be mostly based on simple observable/measurable, and easily enforceable criteria, but not the achievement of fundamentally important composting benefits and avoidance of negative impacts. Two key examples of the flawed imposition of limits in the proposed rules are:

- Arbitrarily large setbacks for locations of composting operations which are not based on actual need, but more on presumptions that composting will generate objectionable odors. However, properly operated and maintained composting is not odorous, odors actually an indicator of improper aeration and off gas controls.
- O Unnecessary and arbitrary limitations on the quantities of allowed compost production per unit time. Instead, particularly for on farm composting, allowable production quantities should be primarily based upon the needed quantities for the acreage and organic benefits and soil amendment needs of individual properties. A limit based on needed compost amendment quantity per acre would be more reasonable and acceptable, not only for a single property but for all properties under the same farm management, plus desired compost products for sale to others.

- A. Key principles to encourage and accomplish the important purposes & objectives of any regulation of and ensuring high quality composting and utilization in Boulder County include:
 - Employing and ensuring that only the most appropriate scientifically, technically feasible and proven, economical, and environmentally sound/proven composting methods are utilized in Boulder County,
 - to prevent false solutions to laudable goals such as limiting greenhouse gas emissions from organic wastes management,
 - failing to utilize holistic or full life cycle assessment (LCA) methods of environmental impact and true economics,
 - o and result in unintended negative consequences.
 - Applying appropriate rules and design/management to ensure traditional land use perspective and goals of being good neighbors occurs,
 - by ensuring compost odors or pollutants are not impacting neighborhoods and neighbors, nor the general environmental quality;
 - by properly conducting composting which does not produce objectionable odors, airborne particulate matter or toxic gases;
 - nor does composting cause groundwater or surface water pollution when well managed.
 - Accomplishing multiple goals of good public policy, by laws, codes and guidance, of Boulder County, including by setting high examples for the State of Colorado, our nation, and beyond, including:
 - o <u>reducing</u> the environmental, public health, social, and economic impacts of solid waste management of compostable materials, by
 - diverting a maximum of suitable compostable solid wastes generated in Boulder County that otherwise are landfilled to composting, and thereby
 - preventing a major source of greenhouse gas (GHG) emissions from landfill gaseous emissions, notably including methane (CH₄), nitrous oxide (N₂O), with atmospheric warming potentials 30 to 80 times and nearly 300 times higher respectively, than carbon dioxide (CO₂),
 - as well as preventing water pollution from seepage and runoff from landfills, and
 - displacing use of toxic chemicals in agriculture and landscaping (synthetic fertilizers and pesticides) by high quality plant nutritional and soil improving composts.
 - protecting public health and safety by improving/ensuring high food quality for our citizens that is safety produced locally by enhanced use of high quality/toxin free composts in regenerable organic agriculture and gardening (from commercial onfarm agriculture and backyard gardening);

- Overall, county composting rules and programs should focus on how to cooperatively engage between private practitioners and governmental bodies to obtain the best combined programs and fully coordinated desired outcomes, environmentally, public health & food safety, promoting regenerative-organic agriculture, and maximal climate protection.
- We envision public-private partnerships as the best path forward, instead of command & control code enforcement regulations which can be counter-productive in achieving multigoals, or otherwise delimiting. Some key and desirable partnership elements include:
 - County programs, supporting functions, and staff should directly interface with and support the private composing practitioners, whether at industrial scale, on farm or small backyard operators. (for example via OSCAR directed grant programs)
 - County programs and engagement, across multiple but functionally integrated departments (OSCAR, Public Works, Parks & Open Space, etc.), should be to support the beneficial functions/purposes of composting, most notably in accessory agricultural and backyard categories, for example by:
 - Providing grants for quality composting infrastructure, particularly to accessory to agriculture operators;
 - including construction and design guidelines assistance of highest quality proven composting methods & facilities, operational, environmental, and compost quality control monitoring instrumentation, mechanical/electrical components for aeration and emissions controls, etc.
 - facilitating input materials collection of acceptable non-toxic compostables, and delivery to small to moderate scale on-farm composting operations (potentially via non-profits such as EcoCycle or other qualified entities)

Key <u>Principles</u>, <u>Justifications</u> and <u>Major Recommendations for Boulder County Composting</u>
<u>Practices</u> for Boulder County are further outlined in the following pages; focused on how to:

- > achieve scientifically based enhanced, environmentally sound public health & safety composting practices,
- minimize climate altering-destructive effects with scientifically supported organic waste management, and
- concurrently achieve overall responsible local production and utilization of high-quality composts and agricultural produce in Boulder County.

We elaborate below and expand upon key principles and specific recommendations regarding how to better promote, conduct composting wisely, responsibly and with scientific validated composting best available practices in Boulder County.

- supporting/encouraging regenerable organic non-chemical based agriculture by making available locally sourced high quality composts to support production of only the highest quality and most healthful agricultural foods, feeds, and other specialty crops;
- o <u>rapid transitioning to regenerative organic agriculture</u>, free of use of toxic and greenhouse gas intensive synthetic chemicals (e.g. large embodied greenhouse gases made from and transported by fossil fuels), most notably and particularly on the Boulder County public owned open space ag lands.
- o <u>reducing</u> "conventional" (aka chemical) agriculture prevalence in our county which relies on damaging synthetic chemicals on public and private lands
 - displacing the usage of high embodied GHG intensity fossil fuel based "conventional" fertilizers and pesticides,
 - eliminating such chemicals which are also toxic to soil microbiology, essential biological life of natural soils, and essential to soil carbon sequestration
 - curtailing the contamination of groundwaters and surface waters with toxic synthetic agricultural chemicals (fertilizers and pesticides)
- B. Key Justifications for encouraging local foods production, exemplary land management, and rapid transitioning to proper composting in Boulder County follow:
 - enhancing soil health and agricultural productivity in Boulder County, by increased use of locally produced organic agriculturally approved composts, notably including
 - soil quality regeneration of distressed and unproductive soils caused by decades of chemical-based farming and other harmful land use practices
 - o displacing harmful and environmentally toxic current agricultural chemicals, notably
 - enhancing public health by supporting transitioning to regenerative organic agricultural practices....notably with the benefits of
 - o locally grown and availability of toxin free non-agchem based foods, animal feeds and other specialty agricultural crops/foods
 - supporting local food and agricultural product farmers, ranchers, food manufacturers, distributors, markets and
 - providing locally grown safe foods, beverages and related products to enhance the public health and quality of life to the citizens of Boulder County and beyond.
 - reducing/minimizing the emissions of greenhouse gases (GHG) from current greenhouse gas intensive landfilling of solid wastes, by replacing landfilling by diversion of suitable organic wastes to local composting operations, by:
 - o avoiding the large embodied GHGs from transporting and landfilling of compostable food wastes, lawn clippings, wood and other vegetative wastes

- local composting with reduced haulage, instead operated by farmers and home gardeners, thereby eliminating the large transportation costs and embodied fossil fuel related greenhouse gas emissions from current composting entities.
- o composting processes that utilize only the most scientifically proven composting methods, notably minimizing the releases of not only CO₂ (carbon dioxide), but high global warming gases such as N₂O (nitrous oxide) and CH₄ (methane).
- > Demonstrating, and encouraging wise and environmentally responsible waste management composting practices on other lands managed privately or by other public jurisdictions of Boulder County, throughout Colorado and beyond.

C. Recommendations for Boulder County Composting Practices, and Governmental Codes

<u>Properly and meaningfully designed rules or codes for composting</u>, at least for the *industrial* and *accessory to agriculture* composting operations, must absolutely be based on:

- The best available technology (BAT) and up-to-date scientific and engineering knowledge must be included in rules on how to properly conduct composting to:
 - o Produce the highest quality composts for enhancing soil quality and overall environmental quality for all compost end uses.
 - Minimization of greenhouse gas emissions, odors, and other air, water and environmental quality impacts (these emission characteristics are indicators of poor quality composting design & operations, for product quality/benefits, health/safety, and environmentally).
 - o For agricultural uses, whether by industrial scale or on-farm producers, the composts produced should have the highest crop nutritional content, particularly retained nitrogen content (preventing and capturing rather than off gassing of important nitrogen phyto-nutrients as ammonia (NH₃), and nitrous oxides (N₂O)), to improve soils and crop yields; and in the compost production processes, such loss of raw material plant nutrients that are serious air pollutants should and can be minimized.
 - Best available composting processes can also include recovery of thermal energy from the thermophilic phase of composting, and otherwise used for waste energy utilization for valuable purposes such as heating greenhouses or other on-farm uses.
 - o For any composts sold or applied to any Boulder County public lands (at a minimum, but preferably to all composting in the county), producers must ensure that finished compost products do not contain undesirable, diseased, pathogenic, or toxic materials; notably persistent non-degradable toxic chemicals or bacterial/viral organisms that were in the input materials, or transformed to toxic or virulent materials in the finished composts.

- Appropriate and established quality control food safety & phytotoxicity testing, certainly for any such compost products sold to public or other off farm uses, or applied to public lands, all must be part of the standard practices/regulations.
- For these above key criteria to be met, it is essential that the best available technologies (BAT) be practiced by all composting parties in Boulder County, particularly those with Industrial and Accessory Agricultural designations.
 - o The CP&P proposed rules do include some limitations on the allowable input materials for each of the categories, but this is insufficient to assure BAT is achieved and all finished composts are safe.
 - o It is important to acknowledge that no biosolids (aka sewage sludge) can be used in making composts that are applied with certified organic agriculture according to USDA National Organic Program (NOP) rules. Any composts produced with biosolids must have strict end use controls since biosolids contain many contaminants and chemical residuals, often recalcitrant and long lasting. Use of any such composts must be explicitly prohibited on any lands growing foods or animal feeds, and preferably prohibited on public county open space lands.
 - Furthermore, composting in Boulder County needs to be consistent with Boulder County goals of encouraging highest quality environmentally responsible and highest food quality agricultural products, and
 - Boulder County Parks and Open Space needs to establish mandated transitioning to regenerable organic and carbon sequestering agriculture on all agricultural open space, in conjunction with utilization of locally produced organic certified composts, and
 - Recently passed 2023 state law (SB 23-253) defined allowable and disallowed input materials in commercial composts, and that law must be followed in Boulder County and an integral part of compost use and production. Any rules/land use codes need to be consistent with this new law/regulations, and others already in effect at Colorado (Department of Agriculture and Department of Public Health and Environment) and at the Federal level.
 - Other compost quality controls, need to be followed by any Boulder County rules or codes such as established by federal agencies including EPA, USDA, FDA, and Colorado agencies such as CDA, CDPHE or other authorities. Cognizance of various composting trade associations and compost quality control guidance is also important.
- > Public educational programs need to be established in and by Boulder County to fully inform all practitioners of composting, from *backyard*, to *accessory to agricultural*, to *industrial composting* practitioners.
 - major emphasis of such composting educational programs needs to be how to achieve the highest quality composts, and lowest environmental and public health impacts, including lowest emissions of greenhouse gases.

- Boulder County CP&P proposed/draft composting rules currently have inappropriate and unnecessary provisions that would prohibit or severely limit composting locally, some of which have been reviewed above. These proposed rules need to be amended and improved to encourage rather than prohibit quality composting. Recommendations follow:
 - o In both Industrial Composting and Accessory Agricultural Composting use categories, the proposed rules include overly stringent "set back" rules for locations of allowed composting activities that are unreasonable, impractical, even unnecessary. Both land use group categories have minimum setbacks of 300 feet from all property lines for composting operations. This effectively prohibits composting on many agricultural properties and ag allowable zoning categories, including many small or irregularly shaped farms in otherwise and often even on farms historically engaged in agricultural uses including composting; and in many land use categories, particularly A, RR, & ER which are in fact operated as agricultural.
 - This constraining set back is seemingly proposed solely based upon concerns about odor from composting.
 - However, with more appropriate compost rules based on only allowing proven non-odor emitting composting methods and suitable input materials, the set backs can be dramatically reduced or even eliminated.
 - Limits on amounts of compost produced in any given period or in inventory or production at any given time, for an individual property are inappropriate as proposed. These limits on allowable amounts of compostable materials and produced composts should either be removed from the proposed rules or at least based upon:
 - Aligning the quantities to the need for the individual property intended cropping or agricultural uses, and the acreage of the properties upon which compost would be needed.
 - And considering not only compost applications for a single property but for compost needs on other properties owned or leased by a compost operation, or even to be sold off site.
 - And finally, since compost is proposed to be defined as a "agricultural product", and allowed to be sold off site, the volume limits of such additional off site sales should be reconsidered, just as other agricultural products are not limited for any given property/operator.
 - o The proposed compost rules contain some curious elements that need reconsideration, improvement, or elimination, including:
 - Elimination of "urea" the compostable raw organic materials. Urea is not a natural organic material, it is a specific chemical name. It seems to a relic from some prior rule, is inappropriate, and should be eliminated from the definition of "organic materials".

The draft "organic materials" definition used for *Industrial Composting Facility* is written with the phrase "but not limited to", hence making the definition totally open ended, essentially meaningless, potentially allowing inclusion of dangerous materials. This definition needs a total rewrite to ensure that only appropriate materials are allowed to be included as feedstock to compost production and utilization.

D. Offer to Boulder County of Expert Support in Developing High Quality Composting Policy

We the undersigned offer to all relevant departments and officials of Boulder County our support in the development and implementation of the highest quality implementation of beneficial and scientifically grounded composting in our home county, all for the purposes of protection and restoration of the lands, soils and the total environment, enhancing & enlarging organic production of safe-high quality local foods, and for the collective benefit to the health, safety and welfare of our citizens.

Over many years we have directly participated in the sciences of agriculture, soil & plant health, public and environmental health, engineering and associated fields, as well directly practicing organic agriculture. We have accumulated major knowledge and peer reviewed collections of applicable science in the fields of soil and plant health, water and air quality, engineering of composting processes/practices. All of this is available to Boulder County to support quality agriculture, foods and public/environmental health of our county, its citizens, and the world. In addition, there are many exceedingly knowledgeable practitioners of and scientifically astute organic and high quality compost manufacturing and utilization in Boulder County. Please call upon us.

We thank you for the opportunity to provide our analysis and recommendations on this element of achieving the above stated common goals.

Signed by founding members of Organic Land and Food Coalition (OLAF) of Boulder Colorado:

- Richard D. Andrews, President, Boulder Innovative Technologies and ZeoponiX; and
 Managing Partner, J.M. Andrews Family Organic Farm LLLP, Boulder County, CO
- Alan Lewis, Vice- President, Environmental Affairs, Natural Grocers (Vitamin Cottage), Boulder, CO
- . Mary Mulry, independent Consulting Food Nutritionist, Boulder County, CO

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