



SUNRISE
ENGINEERING

LOA TOWN
WATER CONSERVATION PLAN

JUNE 2016

LOA TOWN

WATER CONSERVATION PLAN

June 2016

Prepared by:

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LOA TOWN – WATER CONSERVATION PLAN

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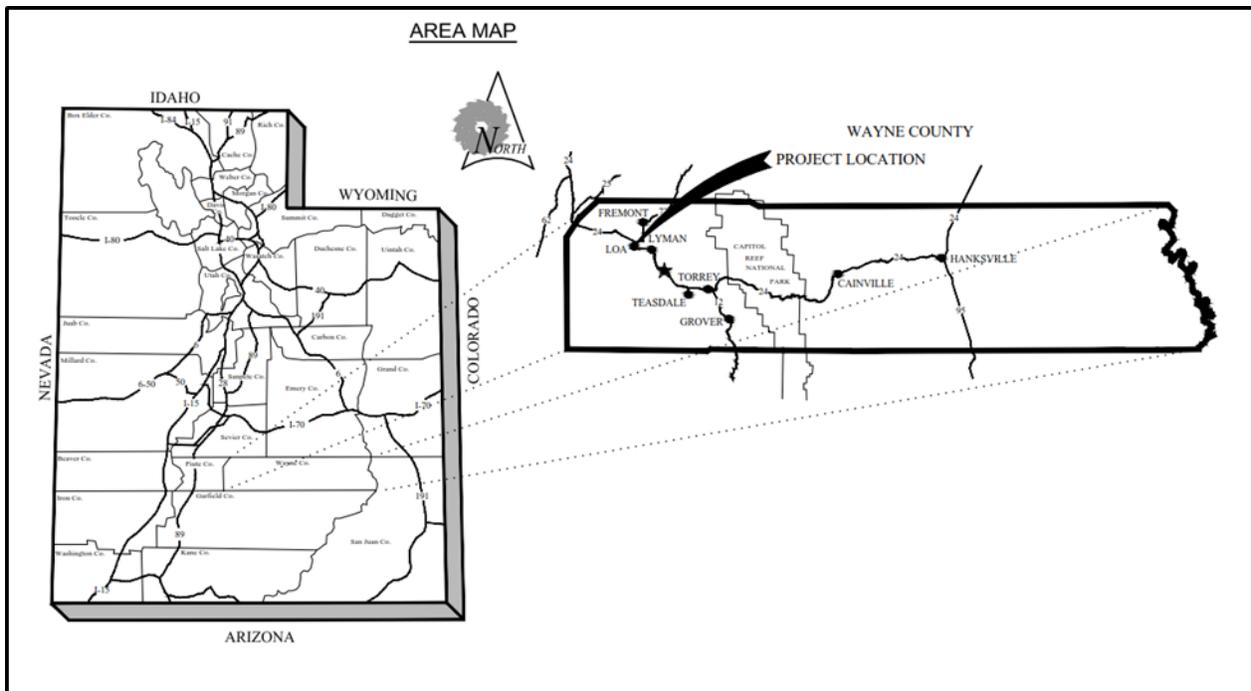
1.0 INTRODUCTION

In response to the continual growth that the State of Utah has seen statewide, Loa Town has become increasingly aware of the future cost and availability of a finite supply of water. Similar concerns have been demonstrated by the state legislature as shown by the Water Conservation Plan Act (House Bill 71) passed and revised in the 2004 legislative session (Section 73-10-32 Utah Code Annotated). This document constitutes the Water Conservation Plan for Loa Town. It is intended to address the concerns of both Loa Town and the State of Utah.

2.0 BACKGROUND INFORMATION

Loa Town is located in Wayne County, approximately 45 miles southeast of Richfield, Utah. The Loa Town culinary water system provides water to approximately 564 residents, in addition to several commercial facilities. The culinary water system supplies water for both indoor and outdoor use. In addition to residential growth, Loa Town is also making preparations for possible commercial growth. A map of the area is shown below in Figure 2.1:

Figure 2.1: Area Map



Loa Town has commissioned Sunrise Engineering, Inc. to complete a water conservation plan in conjunction with the Loa Town Culinary Water System Master Plan 2016. The intent of this plan is to implement better management practices and conservation efforts which will aid in maintaining and conserving their water resources for many years to come. Loa Town currently does not have a water conservation plan in place so the goals listed in this plan are new to the community of Loa.

Loa Town understands the critical nature of maintaining and conserving their water resources in order to meet the water needs of their customers. As a result, the protection and maintenance of the Town's water sources and distribution system is a top priority that is critical to providing the continuous water supply that the customers depend on.

There are currently no formal water conservation measures or education programs that have been implemented by the Town in the recent past. Additionally, there is no one currently fulfilling the role as the Water Conservation Coordinator for the Town. Loa Town is a small community, and it would be a burden to have additional staff, therefore any conservation coordination will be accomplished by existing Town Council members and the water system operator.

2.1 Culinary Water Connections

According to the data provided by Loa Town, there are currently 320 connections on the system. This includes 310 residential connections and 10 commercial connections.

All culinary water connections in Loa Town are currently metered with radio read meters and are read monthly.

Although the Town does utilize a separate unmetered irrigation water system, approximately 35% of the residential and commercial connections use culinary water for outdoor watering.

3.0 EXISTING RESOURCES

3.1 Existing Water Right

The water rights that are owned by Loa Town for culinary water use are listed below in Table 3.1

Table 3.1: Loa Town Water Right Summary

Loa Town Water Rights Summary					
W.R. #	Current Change Application	Uses	Status	Flow (cfs)	Quantity (ac-ft)
95-424	a17821	Municipal	Certificated	0.58	
		Domestic			67.5
		Irrigation - 1/4 Acre			112.5
95-4100	a40278	Municipal	Approved	0.322	233.15
Total				0.902	413.15

It should be noted that Table 3.1 represents a cursory review of the water rights on record with the Utah Division of Water Rights.

3.2 Existing Sources and Distribution Facilities

3.2.1 Loa Town Sources

Loa Town’s culinary water system is supplied by two culinary wells. The Town’s wells are located approximately 1.5 miles northwest of Loa. Both wells are artesian wells and both were flowed at 0.724 cfs, or 325 gpm

The total source capacity for Loa Town is therefore 650 gpm.

3.2.2 Existing Distribution System

Loa Town’s distribution system is comprised of a 10” transmission line from the tanks to the Town, where it reduces to a well looped system of 4”, 6”, and 8” water main lines. There are two tanks on the system, which are summarized below in Table 3.2.2.1.

Table 3.2.2.1: Loa Town Water Storage Tanks

Structure	Material	Capacity (Gal)
Tank 1	Concrete	175,000
Tank 2	Concrete	300,000
Total Storage Capacity		475,000

Loa Town has only one pressure zone. The culinary water system has been hydraulically modeled using the H2O Net hydraulic modeling software. The intent of the water model is to analyze the current system pressures and flow capacity under average day and peak day demand scenarios. The current pressures in the Loa Town water system range from approximately 32 psi up to approximately 92 psi at the end of the system. The pressures under peak instantaneous demands range from approximately 31 psi up to approximately 88 psi at the end of the system.

The available fire flow in the system under projected peak day demands range from 850 gpm to approximately 2,000 gpm with most of the system falling between 900 – 1,700 gpm. The locations that have significantly lower available fire flows are unlooped, dead end lines on the perimeter of the system, or lines that are supplied with undersized pipes. The points in the system that have higher available fire flows are those directly off the main feed line from the tanks to the fairgrounds. It should be noted that fire protection capacity is minimal to nonexistent on the under sized lines that extend to the north, east, and south of the main body of the system.

4.0 CURRENT AND FUTURE WATER USE

4.1 Projected Growth Rates

The average annual growth rate for Loa Town from 2000 through 2010 was 0.86%. The Utah Governor’s Office of Planning and Budget projects that Loa Town’s annual growth rate through 2030 will be 1.18%. It is reasonable to assume that Loa Town will continue to grow. An annual growth rate of 1.00% will be used for the purposes of this Water Conservation Plan.

Table 4.1 shows the projected population for Loa Town using an annual growth rate of 1.00%.

Table 4.1: Projected Loa Town Population

Year	Projected Populaton
2016	564
2021	593
2026	623
2031	655
2036	688

4.2 Equivalent Residential Connections (ERC’s)

One ERC is defined as the amount of culinary water required by an average residential connection. According to the Utah Division of Drinking Water, the average indoor residential demand is 400 gpd per residential connection, or approximately 12,000 gal/month. Because an ERC relates to the amount of water required for the average residential connection, use of this term allows commercial, institutional, or other large water users to be equated to a residential connection. ERC’s are factored into calculations for impact fees, user rates, and other analyses as required for design purposes.

A review of the water usage from the commercial connections currently on the system was performed to determine the equivalent ERC value to assign to the commercial connections. The average commercial

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indoor water use is approximately 100,368 gallons per month per connection, or approximately eight and a half times the usage of a typical residential connection. Commercial connections will therefore be assigned an equivalent ERC multiplier value of eight and a half.

Table 4.2 shows the number of connections for each usage category along with its associated ERC value.

Table 4.2: ERC Equivalents per Connection Category

Current ERC's			
Category	Connections	ERC/Connection	Total ERC's
Residential	310	1	310
Commercial	10	8.5	85
Total			395

The number of culinary water ERC's expected at the end of the planning period can be calculated using the compound interest formula and inserting the projected growth rate, the existing number of culinary water ERC's, and the 20 year planning period for the culinary water system.

The projected number of ERC's for the 20 year planning period is calculated using the compound interest formula as follows: $F = \text{Connections} \times (1 + \text{rate})^{20 \text{ years}}$ where F is the projected number of connections and the rate of growth is 1.00% per year.

Total Residential ERC's: $F = 310 \text{ ERC's} \times (1 + 0.01)^{20} = 378 \text{ ERC's}$

The projected number of ERC's for each category is shown in Table 4.3.

Table 4.3: Projected ERC's by Category

20 Year Projected ERC's			
Category	Connections	ERC/Connection	Total ERC's
Residential	378	1	378
Commercial	12	8.5	102
Total			480

4.3 Present Water Use and Future Water Needs

As noted previously, all of the culinary water connections on the Loa Town water system are metered with radio read meters.

The billing summary for January 2015 to January 2016 showed that a total of 43,635,120 gallons were metered during this period. The usage is summarized by connection type in Table 4.4 below.

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Table 4.4: Annual Estimated Usage

Loa Town Water Usage (Jan. 2015 - Jan 2016)			
	Residential	Commercial	Total
Annual Metered Usage (Gal)	30,935,360	12,699,760	43,635,120
Annual Usage (ac-ft)	95	39	134
Avg Daily Use (Gal)	84,754	34,794	119,548
Avg Daily Use Per Capita (Gal)	150	62	212

It should be noted that approximately 35% of the culinary connections in Loa Town use culinary water for outdoor watering. The average daily use per residential connection is 273 gpd, and the average residential per capita use is 150 gpcd. The overall average daily use per ERC for the system (total usage divided by total ERC's) is 303 gpd.

As part of the Loa Town Culinary Water Master Plan 2016, Sunrise Engineering calculated the current required amount of water rights for the Loa Town water system based on the requirements stated in the Rules. The required water rights represent the average annual demand on the system using the State's recommended quantities for indoor use (400 gal/ERC/day) and outdoor use (1.17 ac-ft/irrigated acre). The calculated water right requirement is 219 ac-ft, or approximately 71,361,369 gal/year. Loa Town is using approximately 27,726,249 gallons less than the estimated average annual demand using the State's values for indoor and outdoor usage.

The projected number of ERC's at the end of the 20 year study period is 480. If the average daily water usage per ERC remains the same at 303 gal/ERC/day, the total system water usage in 20 years will be 53,085,600 gal/year. In comparison, the 20 year projected annual system water demand using the State's estimated values for indoor and outdoor water use would be 264 ac-ft, or 86,024,664 gal/year.

4.4 Water Budget

Loa Town's culinary water system is supplied by two culinary wells. The Town's current culinary water rights total 413.15 ac-ft. As noted in Section 4.3, the total estimated annual water usage for the period of January 2015 to January 2016 was 134 ac-ft. It should be noted that this usage only represents the metered water in the culinary water system, and does not include the unmetered culinary water that is used to irrigate the Town parks and cemetery.

As calculated in the Loa Town Culinary Water System Master Plan 2016, the 20 year projected required water right for Loa Town is 264 ac-ft. Loa Town has sufficient municipal water rights to cover the projected system requirement.

4.5 Culinary Water Rate Structure

Loa Town’s current culinary water rate structure is shown in Table 4.5.

Table 4.5: Loa Town Culinary Water Rate Structure

Type of Service	Water with Base Rate (gal)	Monthly Base Rate	Overage Cost/1,000 gal
Residential	15,000	\$18.00	\$1.05
Commercial	15,000	\$18.00	\$1.05

5.0 WATER CONCERNS, CONSERVATION GOALS AND SOLUTIONS

5.1 Concerns Identified

- A concern related to the culinary water system for Loa Town is the water distribution system. There are many main lines throughout the system that are still 4” thin walled plastic pipe. A few of the Town’s hydrants are fed by these small 4” lines. Being able to provide adequate fire protection is a concern to Loa Town.
- Another concern related to the culinary water system for Loa Town is to be vigilant as the water system is expanded and increased demands are placed on it. This will ensure that the system maintains the capacity to provide for the system wide demands. An important item of system maintenance and management will be to maintain a current hydraulic model for the system as growth occurs to ensure that the system has the capacity to support the growth.
- Although conservation is encouraged through a higher overage rate, no other conservation practices are currently in place.
- The most effective measure for implementing this conservation plan will be public outreach and education. The general public may lack understanding of landscaping water requirements, efficient water use habits, and practices. Water users may not know how much water is required to maintain healthy landscaped areas and how to consistently use water efficiently outdoors. Most water use practices, whether for indoor use or irrigation are based on convenience rather than plant needs and water supply considerations.

5.2 Conservation Goals and Solutions

Loa Town’s current average residential water usage is 150 gpcd, and the current combined (residential and commercial) average usage is 212 gpcd. The 2010 statewide average per capita culinary water usage was approximately 167 gpcd. It is noted that the commercial usage in Loa is disproportionately higher per connection than the residential usage, and represents nearly 30% of the total system usage. It is also noted that 35% of Loa Town’s culinary water connections use culinary water for outdoor irrigation.

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Loa Town recognizes the importance of conserving its limited water resources, and acknowledges that the growth that may be experienced in the near future will place a higher demand on the water that is currently available. Loa Town also recognizes that the State of Utah Division of Water Resources has established a goal to reduce per capita water usage in the state by 25% between the year 2000 and 2025. The Town is currently balancing the priority of promoting water conservation within the system with the priority of promoting commercial growth and enterprise within the community. Many of the commercial interests that are served by the system have access to private water sources, but choose to utilize the Town's system for the convenience and stability that it provides. This mutually beneficial situation is based upon the Town's ability and willingness to supply the water that the commercial interests require at rates that are affordable to the users. As such, the Town will focus its water conservation goals and efforts on the residential portion of the system users. As noted previously, the average residential water usage in Loa Town is 150 gpcd. The Utah Division of Water Resources goal for the statewide residential usage is 125 gpcd, which represents the targeted 25% reduction. The Town acknowledges that residential water usage patterns vary from urban to rural areas, and feels that the Town currently manages its system responsibly and does not allow general waste of water within the system. As such, the Town is committed to maintaining an average residential water usage of 150 gpcd or less as the town continues to grow.

In order to maintain this goal, Loa Town will implement the following measures:

1. Monitor use patterns to detect leaks. Loa Town will continue efforts in monitoring water meters on a regular basis. This will improve the chances of finding leaks as they occur.
2. Begin a public education program. Loa Town will send an inexpensive periodic public education flyer to the general public. It is believed that if people are continuously exposed to water conservation messages, they will improve their water conservation habits. The flyer will provide recommendations for using water responsibly, and will discourage practices that waste water.
3. Maintain a financially stable water system with conservation in mind. Loa Town is interested in considering a tiered rate structure for the residential water usage on the system. The Town will need to investigate this approach more thoroughly prior to implementing any changes, but has set the goal to discuss this option in Town Council within the next year.
4. Establish emergency water conservation contingency plans. The water conservation contingency plan for implementation due to severe drought or other system supply shortages is outlined in section 6.0 below
5. Encourage the use of high efficiency fixtures and watering. Loa Town will encourage the installation of water efficient fixtures in homes and low water use landscaping in yards for both new construction and retrofit of existing structures. This, however, will not be required as the expense would be a hardship on individual households and the Town could not afford to subsidize them.

Loa Town realizes that effective goals must be measurable. While the effectiveness of the measures listed above would be difficult to measure on an individual basis, Loa Town recognizes that the combined effectiveness of the measures can be assessed by comparing overall system usage data, and per capita usage data on an annual basis. Loa Town will therefore review the usage data on an annual basis to determine if progress is being made toward the water conservation goal previously discussed.

5.3 Education Program Information

The following information on efficient outdoor and indoor water use will be disseminated periodically as a one-page conservation mailing (also included in Appendix A).

Efficient Outdoor Water Use:

- Water landscape only as much as required by the type of landscape, and the specific weather patterns of your area, including cutting back on watering times in the spring and fall.
- Do not water on hot, sunny, and/or windy days. You may actually end up doing more harm than good to your landscape, as well as wasting a significant amount of water.
- Sweep sidewalks and driveways instead of using the hose to clean them off.
- Wash your car from a bucket of soapy (biodegradable) water and rinse while parked on or near the grass or landscape so that all the water running off goes to beneficial use instead of running down the gutter to waste.
- Check for and repair leaks in all pipes, hoses, faucets, couplings, valves, etc. Verify there are no leaks by turning everything off and checking your water meter to see if it is still running. Some underground leaks may not be visible due to draining off into storm drains, ditches, or traveling outside your property.
- Use mulch around trees and shrubs, as well as in your garden to retain as much moisture as possible. Areas with drip systems will use much less water, particularly during hot, dry and windy conditions.
- Keep your lawn well-trimmed and all other landscaped areas free of weeds to reduce overall water needs of your yard.

Efficient Indoor Water Use:

- Approximately two-thirds of the total water used in a household is used in the bathroom. Concentrate on reducing your bathroom water use. Following are suggestions for this specific area:
 - Do not use your toilet as a wastebasket. Put all tissues, wrappers, diapers, cigarette butts, etc. in the trashcan.

- Check the toilet for leaks. Is the water level too high? Put a few drops of food coloring in the tank. If the bowl water becomes colored without flushing, there is a leak.
- If you do not have a low volume flush toilet, put a plastic bottle full of sand and water to reduce the amount of water used per flush. However, be careful not to over conserve to the point of having to flush twice to make the toilet work. Also, be sure the containers used do not interfere with the flushing mechanism.
- Install water efficient fixtures whenever possible for retrofits and during new construction.

6.0 CULINARY WATER CONSERVATION CONTINGENCY PLAN

The following water conservation contingency plan is adopted as part of this plan:

Level 1 – Normal Years – In this condition there is currently plenty of culinary water available for normal purposes.

- Encourage voluntary public water conservation measures (i.e. only watering during the cooler parts of the day).
- Mail information on conservation measures, which can be used outside as well as inside.

Level 2 - 75% of Normal Required Supply – In this condition, it is difficult to keep the water tanks full during the daylight hours if people are using culinary water for outdoor purposes.

- Educate the public about the water supply shortage and request cooperation using local public service radio announcements and local newspapers, and posted public flyers.
- Enact emergency rate increase to double all overage tiers.
- Enact mandatory public conservation measures.
- Enforce outside watering restrictions, including watering times and quantities.

Level 3 - 50% or Less of Normal Required Supply – In this condition, it is difficult to maintain tank levels during the full 24-hour day.

- Warn the public about water supply shortage and request continued cooperation using local newspapers advertisements, and posted public flyers.
- Enact emergency rate increase to quadruple all overage tiers.
- Strictly enforce all conservation policies with stiff fines for non-compliance.
- Physically restrict water supplies to (in order of priority):
 1. All outside irrigation systems.
 2. Parks and other non-essential support facilities.

3. Commercial users, restricting the largest, non-animal life support users first.
4. Residential areas
5. Commercial animal life support users.
6. Any other non-life support areas, insuring water supplies to hospitals, hospices, and all other health care facilities, and controlled designated area water facilities.

7.0 IMPLEMENTING AND UPDATING THE WATER CONSERVATION PLAN

This Water Conservation Plan shall be adopted by the Loa Town Council. The Loa Town Council will have responsibility to coordinate the water conservation program goals for Loa Town and coordinate the education program. All council members, Town staff, and members of the general public have the duty and responsibility to report general waste of water, and to conserve water wherever possible.

This Water Conservation Plan will be revised and updated as required to meet changing conditions and needs. The ordaining ordinance for the Water Conservation Plan is attached as Appendix B.

APPENDIX A:
WATER CONSERVATION MESSAGE

LOA TOWN WATER CONSERVATION MESSAGE

Efficient Outdoor Water Use:

- Water landscape only as much as required by the type of landscape, and the specific weather patterns of your area, including cutting back on watering times in the spring and fall.
- Do not water on hot, sunny, and/or windy days. You may actually end up doing more harm than good to your landscape, as well as wasting a significant amount of water.
- Sweep sidewalks and driveways instead of using the hose to clean them off.
- Wash your car from a bucket of soapy (biodegradable) water and rinse while parked on or near the grass or landscape so that all the water running off goes to beneficial use instead of running down the gutter to waste.
- Check for and repair leaks in all pipes, hoses, faucets, couplings, valves, etc. Verify there are no leaks by turning everything off and checking your water meter to see if it is still running. Some underground leaks may not be visible due to draining off into storm drains, ditches, or traveling outside your property.
- Use mulch around trees and shrubs, as well as in your garden to retain as much moisture as possible. Areas with drip systems will use much less water, particularly during hot, dry and windy conditions.
- Keep your lawn well-trimmed and all other landscaped areas free of weeds to reduce overall water needs of your yard.

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- Approximately two-thirds of the total water used in a household is used in the bathroom. Concentrate on reducing your bathroom water use. Following are suggestions for this specific area:
 - Do not use your toilet as a wastebasket. Put all tissues, wrappers, diapers, cigarette butts, etc. in the trashcan.
 - Check the toilet for leaks. Is the water level too high? Put a few drops of food coloring in the tank. If the bowl water becomes colored without flushing, there is a leak.
 - If you do not have a low volume flush toilet, put a plastic bottle full of sand and water to reduce the amount of water used per flush. However, be careful not to over conserve to the point of having to flush twice to make the toilet work. Also, be sure the containers used do not interfere with the flushing mechanism.
 - Install water efficient fixtures whenever possible for retrofits and for new construction.

APPENDIX B:
WATER CONSERVATION PLAN RESOLUTION

WATER CONSERVATION PLAN RESOLUTION

LOA TOWN

RESOLUTION NUMBER 06-9-16

A RESOLUTION AMENDING THE LOA TOWN CODE PERTAINING TO THE ADOPTION OF A WATER CONSERVATION PLAN.

Section 1 Preamble:

- A. WHEREAS, Loa Town operates a culinary water system; and
- B. WHEREAS, the Town Council understands the need to use water in a more efficient manner to allow for future sustained growth of the community.

Section 2 Ordaining Clause:

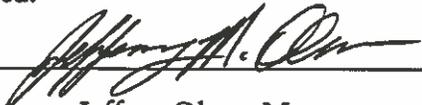
NOW, THEREFORE, IT IS ORDAINED BY THE TOWN COUNCIL OF LOA, UTAH:

Water Management and Conservation Plan

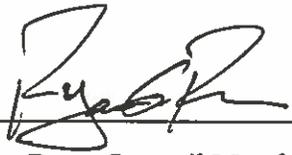
The Water Conservation Plan of Loa Town is hereby approved by motion of the Loa Town Council on the 9 day of June, 2016. The plan will be amended not less than every five years, or as required by the State of Utah, and will continue to play a vital role in the future development of Loa, Utah.

PASSED, APPROVED on June 9, 2016,

Signed:



Jeffery Olsen, Mayor



Ryan Rees, Council Member



Bart Brian, Council Member



Cody Grundy, Council Member



Gary Brian, Council Member

ATTEST:



City Recorder

(SEAL)





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